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Economy in Railway Shops

A few weeks ago we mentioned the advantages to be obtained by operating railway shops in such a manner that the progress of the work may be carefully watched with a view of eliminating lost motion and correcting unprofitable practices. There is another point of attack that is open for the road that realizes the opportunity of decreasing its operating expenses by the practice of economy in the maintenance of equipment. We refer to the installation of the improved equipment that is now available for the railway shop. A careful analysis of the shop equipment field will show the intelligent shop engineer machine tools and devices that will materially reduce the cost of production. Of course, money is required to purchase these improved devices, but money is required in almost every case where improvements are to be made. The main question is: Where can the money that is available be spent to the best advantage? Industrial concerns find it profitable to employ the most improved methods in manufacturing their products, the automobile industry being an illuminating example. Much progress can also be made in railway shops if the problems are carefully studied and scientifically analyzed. A dollar saved in maintaining equipment is as valuable as a dollar saved in transportation expenses.

Prosecutor, Judge and Jury

What would be said if the district attorney prosecuting a case were to be suddenly made judge and given also the right to dispense with a jury, and proceeded to hear the remainder of the case which he had begun as public prosecutor? Yet the prosecuting lawyer in the anthracite coal case was, when the case was partly completed, appointed examiner for the Interstate Commerce Commission and sat as examiner through the rest of the case. On the report of this examiner and on the record the Interstate Commerce Commission will decide this tremendously important and highly complicated case. The more conscientious of the commissioners may make some attempt to study the record for themselves, but it would seem to be an impossibility for any one of them to make a thorough study of this very voluminous collection of documents, and the opinion of the majority of them will be based on the report of the examiner; in other words, on the report of the man who began the case as prosecutor. Regardless of how high the ethical standard of this particular lawyer is, his study of the case was originally made with the object of showing that the railroads were wrong. Only by so doing could he add to his reputation as a successful lawyer. It seems hardly possible that any man, no matter how conscientious, would not be to some extent influenced in his way of looking at things by such a preliminary study. This hearing of cases by examiners is another instance of absentee landlordism on the part of the commission, and besides this it is open to objection for other reasons, as in the instance mentioned above. Furthermore, the commission appoints a special counsel to act as a district attorney, as it were; that is, prosecutor. Now the prosecutor may quite possibly be a friend of the examiner who hears the case. This may or may not have ever taken place, but it is a possibility. The only way that the prosecutor can make a reputation for himself is by winning his cases. He is liable, therefore, to become a persecutor rather than a prosecutor, and the influence he can bring to bear on the mind of the examiner may be far stronger than that of the attorneys for the railroad involved in the case. The commission in most cases goes on the report of the examiner in making its decision. This is by no means a wholly fair proceeding to the railroad.

Car Shortage and Surplus Statistics

At the meeting of the American Railway Association in Chicago last week, it was decided to discontinue the compilation of the statistics regarding car surpluses and shortages and car balance and performance. This action was recommended by a special committee composed of some of the leading operating officers of the country. The *Railway Age Gazette* hesitates to disagree with the conclusions of such men, and yet it is most decidedly of opinion that this action was a serious mistake. It may or may not be true that the statistics in question can be so used as to increase the efficiency of operation of individual roads; but railway managements have something else to do besides operate their properties efficiently. They have to defend the properties against unjust regulation. In order that they may do this they must have and use information showing that the attacks made are unjust. Now, some years ago there were serious car shortages. These resulted in the passage of numerous reciprocal

demurrage laws which were intended to compel the roads to furnish cars promptly and were predicated on the assumption that the railways had been negligent in developing their facilities. Periods of traffic congestion and car shortage will come again. The railways will then be criticized again and other proposals will be made for action to compel them to furnish cars promptly. The most effective answer to such proposals would be the presentation of the statistics of car surpluses. The passage of a very little unfair and burdensome legislation would cost the roads more than they would save in many years by discontinuing the compilation of these figures. The railway managers have a great capacity for forgetting and repeating the errors of omission and commission which have got them into their present troubles.

WHAT IS THE MATTER WITH THE RAILWAYS AND REGULATION?

THE attitude which railway men have assumed toward railway regulation, especially within the last few years, has been puzzling to many intelligent persons. These persons know that before the present policy of regulation was adopted the railways made their own rates and managed their own affairs. They know that the rates made then averaged in some years lower and never much higher than now. They know also that there was a progressive increase in the prosperity of the roads before the present system of regulation was adopted. Why, therefore, they naturally ask, do railway men complain so much about regulation? If the roads could prosper before, why can they not now? These questions have to a large extent remained unanswered. Therefore the suspicion has been engendered that railway men have been attacking the policy of regulation followed because they resent any public control and desire entirely to destroy it. The questions referred to deserve to be answered. It is most important that they shall be answered. Briefly stated, then, *the reason why railway men are justified in criticizing the current policy of regulation is that it is steadily undermining the vitality of the railway industry;* and the reason why it is *doing so is that it is based on theories and principles drawn from the experience of the railways before effective regulation was begun and on the assumption that their experience following the adoption of this policy would be and has been the same as it was before, whereas, largely by a coincidence, the course of developments since the present policy of regulation was adopted has been entirely different from what it was before, and for this reason the assumptions and principles on which the present policy of regulation is predicated are wrong.*

Let us briefly survey the course of developments just before the present policy of regulation was adopted and their course since, and we shall see that the foregoing statements are conclusively supported by the facts.

There had been more or less regulation for a good many years. But the present policy dates from August, 1906, when the Hepburn Act went into effect, this being immediately followed by the passage of a mass of state legislation relating to railways. Therefore, between the time when this policy was entered on and the end of the last fiscal year for which we have complete statistics of the Interstate Commerce Commission, June 30, 1913, there was a period of seven years. Let us, therefore, survey the course of developments in the seven years ending on June 30, 1906, and in the seven immediately following.

The former period was one of remarkable expansion in all business, and especially in the railway business. At its beginning railway facilities were built in advance of traffic. There were no considerable advances in the wages of railway employees during this period. There was a rapid growth of traffic and as at its beginning railway facilities exceeded the demands on them, every increase of traffic resulted in each unit of traffic being handled at a lower cost, both in property investment and in operating expenses. Therefore the railway business during this period was economically one of so-called "increasing returns." This would have been so in the absence of an upward tendency of rates; and, as a matter of fact, both the average passenger rate and the average freight rate increased slightly. All the conditions were favorable for a substantial increase in railway earnings and in the percentage of return on investment, and in consequence, the prosperity of the railways did increase to a marked degree.

These developments inspired a spirit of optimism regarding the future of the railways in railway managers, investors and speculators and the public. Investors, speculators and railway managers were so optimistic that the prices of railway securities soared to unheard of figures and the control of some railways by others was purchased at prices which were obviously predicated on the assumption that increases in railway net return would continue indefinitely. But the public was not disposed to let promoters, investors and speculators enjoy all the benefits of the railways' increasing prosperity. It was argued by economists and others that the public should share in it through reductions of rates, and therefore the Hepburn Act empowered the Interstate Commerce Commission not only to correct discriminations, but to reduce rates which it found excessive. Soon afterward there was a flood of state legislation reducing freight and passenger rates; and in 1906 Congress provided in the Mann-Elkins Act that the burden of proof should be upon the railways to establish the reasonableness of any advance in rates made after January 1, 1910. No power was given the commission to raise rates or prevent reductions. The entire system assumed that the tendency of rates should be downward.

Thus the present policy of regulation was begun. By a coincidence the year 1906 not only marked the beginning of the new policy of regulation, but also closed a cycle in railway development. In the fall of that year came the greatest congestion of traffic and car shortage ever known. The traffic had caught up with and now exceeded the facilities. Business conditions and public opinion demanded the investment of enormous sums of new capital in the railways to provide additional facilities, and large new investments were made. In 1907 the railway brotherhoods began extensive and successful movements for large increases in wages. The states and nation quickened the pace at which they were raising railway taxes. And beginning in 1907 there was a marked slowing down in the growth of railway traffic.

The resultant of all these tendencies would have been that the railway business would have ceased to be one of increas-

	1899	1906	1913	Increase 1906 over 1899	Increase 1913 over 1906	Per cent increase 1906 over 1899	Per cent increase 1913 over 1906
Passengers hauled one mile per mile of line	77,821	114,529	143,067	36,708	28,538	47.17	24.92
Average rate per passenger mile	1.925c	2.003c	2.008c	.078c	.005c	4.05	.25
Tons hauled one mile per mile of line	659,565	982,401	1,245,158	322,836	262,757	48.94	26.74
Average rate per ton mile	.724c	.748c	.729c	.024c	.019c*	3.31	2.54*
Investment in road and equipment per mile	$56,079	$59,624	$66,900	$3,545	$7,276	6.32	12.23
Gross earnings per mile	$7,005	$10,460	$12,873	$3,455	$2,413	49.32	23.07
Average wage per employee	$562	$588	$758	$26	$170	4.62	28.91
Average operating expenses per mile	$4,570	$6,912	$8,939	$2,342	$2,027	51.24	29.32
Average net earnings per mile	$2,435	$3,548	$3,934	$1,113	$386	45.70	10.8
Average taxes per mile	$247	$336	$521	$89	$185	36.03	55.06
Average operating income per mile	$2,188	$3,212	$3,413	$1,024	$201	46.85	6.25
Per cent net operating income on property investment	3.9	5.33	5.1	1.43	.23*	36.66	4.31*

*Decrease.

ing returns and become, for a time at least, one of decreasing returns, even if the new policy of regulation had not been adopted and rates had remained unchanged. But the new policy of regulation was applied to these new and changed conditions. Instead of rates being increased the average freight rate was reduced. There were thus converged upon the railways, first, influences tending to turn their business from one of increasing returns to one of decreasing returns, and, second, a policy of regulation predicated on the theory that the business was always one of increasing returns and that wherefore the tendency of rates ought always to be downward.

That the course of developments in the periods before and since 1906 has been as we have said is clearly demonstrated by the statistics. The reader's attention is invited to the table on the preceding page.

It will be seen that this table shows that practically every condition favored an increase of income greater in proportion than the increase in outgo in the first period, while practically every condition favored an increase in outgo greater than the increase in income in the second period. The density of passenger traffic increased 47 per cent in the first period and less than 25 per cent in the second. The density of freight traffic increased almost 49 per cent in the first period and less than 27 per cent in the second. The average rate per ton mile increased 3⅓ per cent in the first period and declined 2½ per cent in the second. Gross earnings increased over 49 per cent in the first period and only 23 per cent in the second.

On the other hand, investment in road and equipment increased only 6⅓ per cent in the first period and over 12 per cent in the second. *The average annual wage of labor increased only* 4.4 *per cent in the first period and* 29 *per cent in the second.* Operating expenses increased 51 per cent in the first period and only 29 per cent in the second, but this was because there was a smaller increase in the traffic to be handled in the second period; and it will be noted that the increase in operating expenses in the second period was relatively greater than the increase in either freight or passenger traffic. The increase in taxes per mile was 36 per cent in the first period and 55 per cent in the second. The resultant of the operation of all these forces is summarized in the figures for average net operating income per mile, the increase which in the first period was almost 4/ per cent, and in the second period only 6.25 per cent, as compared with an increase in investment per mile in the first period of only 6.32 per cent and an increase in the second period of 12.23 per cent!

It should be borne in mind, in this connection, that in 1913 the earnings of the railways were the greatest in their history, the total per mile being over 23 per cent larger than in 1906. Enough is known about the results in the fiscal year 1914 to show that when the complete figures for that year are available they will demonstrate even more strikingly than do those for 1913 how true it is that since 1906 the railway business has been one of decreasing instead of increasing returns. For example, we know that in Official Classification Territory the net return on property investment in 1914 was only 3.99 per cent, the lowest figure reached in 15 years. It may be said that the railways earned so much before 1906 that they should have had enough left to carry them through the period of decreasing returns since then. But while the increase in net earnings before 1906 was relatively great, the average earned even in 1906 was not absolutely great, the rise being from 3.9 per cent in 1899 to 5.33 in 1906.

The summation of the whole matter is that beginning in 1906 the country adopted a policy of regulation based on an experience in the preceding decade which led railway financiers, railway officers, shippers and the public to look on the railway business as one of increasing returns, and therefore as one in which the tendency of railway rates should always be downward, and the machinery of the state and national governments have therefore been used since then to hold railway rates down and reduce them. But experience since has been entirely different from experience before 1906. Experience in these two periods has shown that the railway business may be during one period economically a business of increasing returns and in another one of decreasing returns. It has been the latter kind of business since 1906. When economic conditions in general tend to cause diminishing returns, regulation should be such, if the vitality of the railways is not to be undermined and the public prosperity is not to be menaced, as to permit an upward tendency of rates; and the reason why regulation has been and is doing great harm, is that it has run and is running counter to the plain economic tendencies of the time. The trouble is that the railways have been and are still being ground between the lower mill stone of natural and irresistible economic tendencies and the upper millstone of a system of regulation intended to be applied to entirely different and opposing economic tendencies.

What is the remedy? The only remedy is a recognition by the public and the regulating authorities of the plain facts and a change of the policy of regulation accordingly. There is strong reason for believing that developments in the railway business go in cycles; that, in accordance with certain economic laws, there are periods when on any given basis of rates the net return tends to increase and other periods in which on any given basis of rates the net return tends to decrease. If regulation is not to be destructive of the welfare of the railways and the public it must be made flexible enough not only to hold down and reduce rates when these things are justified, but also to maintain and advance rates when these things are needed.

AN UNUSUAL LOW GRADE DEVELOPMENT

JAMES J. HILL is generally recognized as the pioneer exponent of low grade lines as a means of increasing the trainload, and the Great Northern stands today as a practical example of the working out of his ideas. When control of the Burlington was secured by the Great Northern and Northern Pacific, the purpose, of course, was to give the Hill System an entrance to Chicago and access to the large area in the middle west between that point and Denver. The two points of contact between the Burlington and the Great Northern-Northern Pacific lines are St. Paul and Billings. It is not surprising therefore that one of the most comprehensive developments of low grade trunk lines should be carried out on that part of the Burlington leading southeast from Billings, the purpose being to give the Hill system a low grade line from the Pacific coast to Chicago and the Ohio river, and also to Denver and the Gulf of Mexico, as described on another page of this issue.

While we have previously emphasized in these columns the fact that there is a limit to the expenditure which a road is justified in making to secure a low grade line, in this case the cost is moderate when the entire development is considered, while in addition to the local traffic which will follow the opening of the various sections of these lines, there already exists a fairly heavy through traffic which will be turned over to them.

The point of special interest in this entire project is the way in which these various links are being built with reference to the project as a whole, through the rougher and heavier, as well as the more level country, so that when it is all finished it will be possible to run trains from Billings or from the Ohio river to the opposite terminal with almost no breaking up at intermediate terminals to adjust the tonnage for different grades. Practically the only line of similar length on which this condition is found is that of the Santa Fe from Chicago to Belen, N. Mex., a distance of almost 1,400 miles, over which trains are despatched with the same tonnage from one end to the other, the differences in the ruling grades on the several divisions being compensated for by the adjustment of motive power.

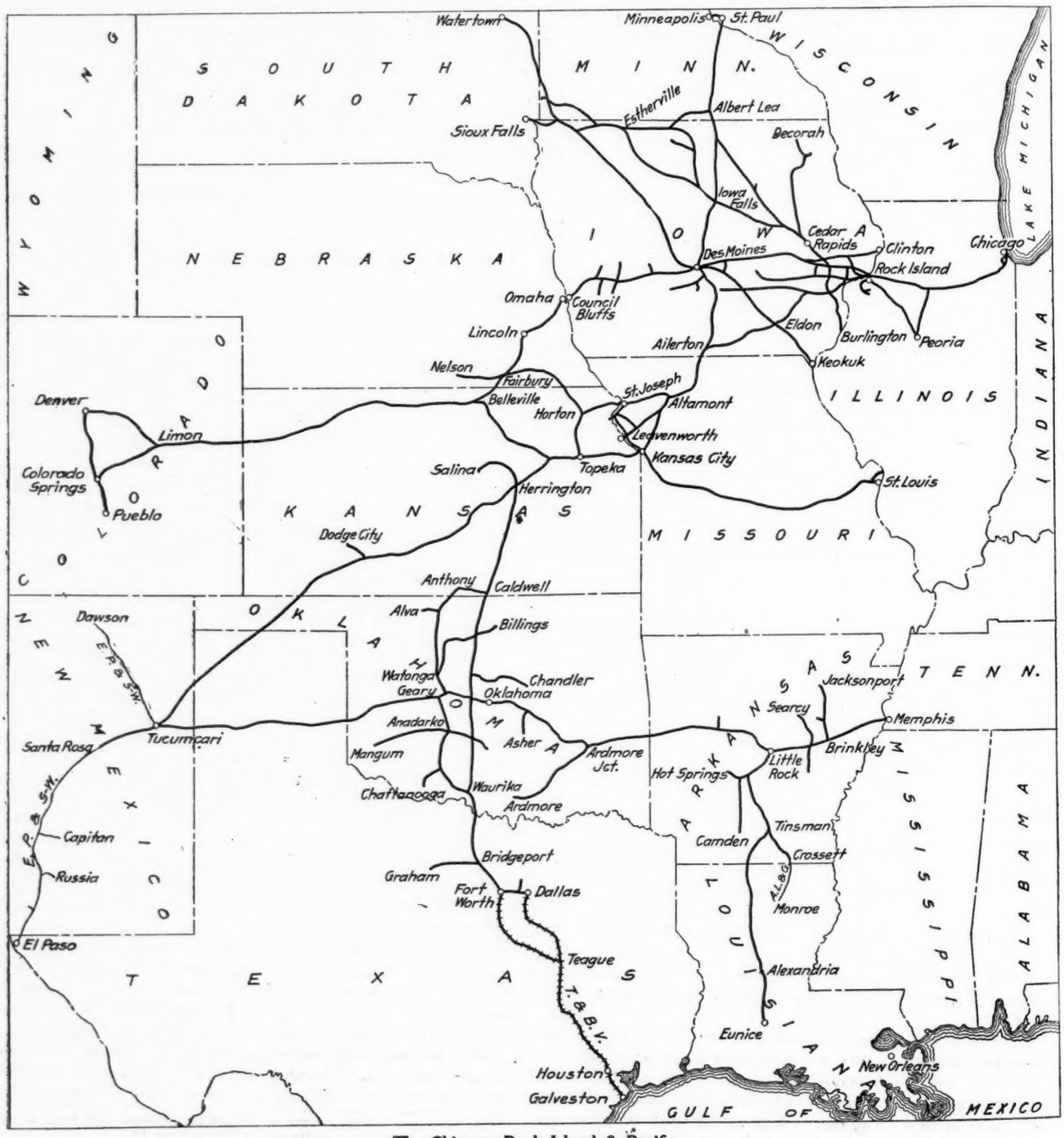
While the economy of reducing grades over a single division is generally recognized, this economy is materially increased when the reductions are extended over connecting divisions so that the cost of breaking up trains because of different tonnage ratings is eliminated. Local conditions seldom permit the development

of a system of low grade lines as extensive, as that here outlined; and the utilization to such an extent of the opportunities that do exist is so rare as to be of unusual interest.

An interesting detail of this project is the evident belief of those in control of the Hill Lines that a considerable increase in the north and south traffic is to be expected, as indicated by the taking over of the Colorado & Southern in 1909, and by the extension of the low grade line of the Burlington to the Ohio river, where the construction of a $4,000,000 bridge was authorized a few weeks ago.

CHICAGO, ROCK ISLAND & PACIFIC

JOSEPH W. FOLK, as prosecuting attorney for the Interstate Commerce Commission, would lay all the present troubles of the Rock Island to evil financial practices of the group of men who have been in control since 1902. President Mudge, in the annual report for the fiscal year ended June 30, 1914, would, by implication, lay the Rock Island's present troubles to reduction in rates, increased rates of wages, increased expenses due to legislative enactments, increased taxes per unit of value and increased cost of capital funds. The truth lies between the two. Mr. Mudge attempts to show that during the years from 1902 to 1914 the property has been improved to an extent that might fairly be said to keep it abreast of its competitors. Capital securities have not been unduly added to, increased operating efficiency has kept pace with the progress of the science of railroading, and the gain in traffic on the Rock Island has been commensurate with the growth of the territory served. Mr. Folk's accusations are so oratorically general, and the strikingness of the picture that he draws is so much a matter of splashes of color indiscriminately applied, that it is impossible to summarize in work-a-day language just what the crime is that has been committed; but in substance it is that in some way the control of the Chicago, Rock Island & Pacific Railway Company by the



The Chicago, Rock Island & Pacific

unfortunate and badly conceived holding company, in turn controlled by a small group of individuals, has resulted in bringing the railway company to the verge of bankruptcy.

In the first place, as of June 30, the railway company was not on the verge of bankruptcy, and although today it is badly in need of some new capital, its earning power is not really impaired and its securities hold out possibilities as a semi-speculative investment that are very far from suggesting a property on the verge of bankruptcy.

Although the Rock Island's history has often been described in the *Railway Age Gazette*, a brief summary of it properly belongs with the comments on this year's annual report. In January, 1902, Chicago, Rock Island & Pacific Railway common stock was selling at 154, and by October 1 was selling at 200. During 1901 the stock had ranged in price from 117 to 136, and during that time D. G. Reid, W. H. Moore and W. B. Leeds had bought sufficient stock to control the board of directors. A plan was put through by which two holding companies were formed—the Chicago, Rock Island & Pacific Railroad and the Rock Island Company. Stockholders of the old company, the Chicago, Rock Island & Pacific Railway were offered $100 in Rock Island common, $70 in Rock Island preferred and $100 in railroad 4 per cent collateral bonds for each $100 of their railway stock; this railway stock to be deposited as the collateral for the 4 per cent railroad bonds. Voting control of the three companies rested in the preferred stock of the Rock Island company. There was in this scheme absolutely no inflation of the railway company's securities; there was simply an exchange of pieces of paper for other pieces of paper with a very much larger nominal value. The income of both holding companies has been nothing more nor less than the dividends which the railway company paid each year on its stock, of which it had at that time about $60,000,000 outstanding, since increased only to $75,000,000.

Operating at a 61.60 per cent ratio in 1902, the company was earning 12 per cent on its $60,000,000 stock, although paying but 4 per cent, while in 1914 the company operated at a 75 per cent ratio and failed by over $3,000,000 to earn a 5 per cent dividend on its $75,000,000 stock, which would have been necessary to pay the interest on the collateral trust railroad 4's.

Briefly summarized, Mr. Mudge's review of the history of the property from 1902 to 1914 is as follows: The mileage increased from 4,094 miles to 8,328 miles; renewal of rails had changed the character of road from one on which a quarter of the mileage was laid with 80-lb. rail and three-quarters with 70-lb. rail, or less, to one on which four-sevenths was 80, 85, 90 and 100-lb., and three-sevenths 70-lb., or less, and tie renewal had resulted in nearly half of the total ties now in track being treated ties. In 1902 about half of the road was ballasted, much of it poorly; in 1914 5,440 miles out of the total 8,328 was ballasted, most of it with rock, burnt clay and gravel; bridges had been strengthened; the mileage of tracks block signaled increased from 20 to over 2,300; terminal facilities and shops had been added to to the extent of $15,000,000; available tractive power of locomotives had been tripled; capacity of freight cars had been more than doubled; passenger equipment had been added to and replaced, making the comparison between 1902 and 1914 as 475 wooden cars to 817 wooden cars and 346 all-steel cars. In the meantime outstanding securities had increased only from $45,713 per mile to $46,730; the capital stock showed a decrease, while the funded debt showed an increase of from $28,088 per mile to $36,604.

All this leads Mr. Mudge to the "indisputable" conclusion that the "primary and fundamental causes for the failure of your company to earn dividends are" those enumerated at the beginning of these remarks. This conclusion hardly seems indisputable.

The Chicago, Burlington & Quincy earned nearly 13 per cent on its capital stock in 1914, compared with less than 10 per cent earned on the same amount of capital stock in 1902. The Burlington's mileage increased only from 8,124 miles in 1902 to 9,264 miles in 1914. The outstanding capital stock remained the same, $110,000,000, and the funded debt outstanding increased only from $18,700 per mile of line operated in 1902 to $19,700 per mile of line operated in 1914. The Burlington's passenger-mile rate in 1902 was 2.12 cents, and its ton-mile rate 7.72 mills; in 1914 the passenger-mile rate was 1.89 cents and the ton-mile rate 7.29 mills. In 1902 the passenger-mile rate on the Rock Island was 2.17 cents and the ton-mile rate 1.06 cents; in 1914 the passenger-mile rate was 1.92 cents and the ton-mile rate 8.6 mills. There is considerably more of a reduction in the ton-mile rate on the Rock Island than on the Burlington; but just as difference in character of traffic largely accounts for difference between the present Rock Island and Burlington rates, so it in part accounts for the difference between 1902 and 1914 rates on the Rock Island. In 1902 the Burlington's average revenue trainload was about 252 tons, and in 1914, 479 tons. The Rock Island's trainload in 1902 was 183 tons, and in 1914, 306 tons.

There is something here besides adverse legislation and general conditions to explain why the Burlington, affected by the same general conditions and by adverse legislative interference, has been able to offset these conditions, while the Rock Island has not. The holding company device *per se* is not an adequate explanation; it was rather the way in which this device was used.

The great and fundamental difference is that the Burlington, besides spending the proceeds of the sale of capital securities on additions and betterments to its property, has made an additional investment in the property through surplus income of $145,683,808. The Burlington's stock outstanding has remained the same, as has the Rock Island's since it was deposited in accordance with the offer of 1902 for exchange of securities.* Whereas the Burlington was able to make its capital expenditures out of surplus without an additional stock issue, the Rock Island was not, and the fact that the agreement under which the stock was deposited prohibits the issue of more stock, either common or preferred, has prevented any financing being done in this way. To this extent the holding company device is directly responsible for the failure of the company to finance its needs through an additional stock issue.

The Rock Island has been well maintained and has been, and is, very well operated. It was in the broader policy of management that the mistakes were made. Neither Judge Moore nor D. G. Reid was a railroad man, nor had they ever taken the time to become railroad men. While the Burlington was spending millions of dollars in grade revision, the Rock Island was operating over the same old 1½ and 2 per cent grades. During all this time from 1902 to 1914 the small group of New York directors held the purse strings. There were able men in the operating management of the Rock Island, but their influence with the New York directors was not sufficient to enable them to awaken the latter to a realization of the opportunity they were missing and to secure a change in policy. All of the things which are recited in the 1914 report as having been done for the betterment of the property added to the value of the service which the road gave; but the essential expenditures for grade revision which were needed to reduce cost of transportation per unit were not made. All of this may be summed up by saying that the management of the road was controlled from New York by a group of shortsighted financiers whose knowledge of railroading was of the slightest. The holding company device permitted control of the road by this small group through a very much smaller actual investment than would have been necessary without the device; and it was the mistaken policy of the men in control, rather than the mere holding company device, that caused the mischief.

The loss of something over $8,000,000 in connection with the merger with and later separation from the St. Louis & San Francisco, is another phase of this same matter, although a more *directly* serious one to the property, since the $8,000,000 loss was a direct drain on the assets of the railway company.

When we have made the allowances indicated above, President Mudge's conclusion is modified as far as it needs to be modified. All of the things which he points out as having tended to re-

*The increase from $60,000,000 to $75,000,000 in stock took place before the stock was deposited as collateral for the railroad 4's.

duce the net of the Rock Island have taken place. If the genius of a Hill or a Harriman, with strong banking support, might during the years between 1902 and 1914 have offset these adverse conditions as it did in the case of the Burlington and of the Union Pacific, this is no reflection whatsoever on the operating management of the Chicago, Rock Island & Pacific, nor need it be a subject of undue alarm, either to investigator Folk or the security holders of the railway company.

The present condition of the Chicago, Rock Island & Pacific Railway is critical, but very, very far from hopeless. Dividends on the railway company's stock having been discontinued, the railroad 4's have necessarily defaulted in their interest payments, and the collateral securing the 4's, which consists of railway stock, has been ordered sold under foreclosure. The railway company operates 8,205 miles of road. In 1914 its total operating revenues amounted to $67,667,000, or 4.50 per cent less than in the previous year. Its total operating expenses amounted to $51,000,000, or 2.86 per cent less than in the previous year. Other income fell off by 84 per cent, and interest and rentals increased by 5.62 per cent, so that there was a net income available for dividends of but $451,000, as compared with $4,058,000 in the previous year. The two quarterly dividends in the first half of the present fiscal year were paid, calling for $1,872,000, so that there was a deficit of $1,421,000. In part, the falling off in other income was due to the failure to receive 4 per cent on the Toledo, St. Louis & Western $5,447,000 4 per cent stock held by the Rock Island. There is no very clear and concise statement in the annual report of the increase in funded debt outstanding in the hands of the public. The statement that $30,519,000 is the net increase in the funded debt is followed by the statement that of such bonds and notes issued during the year and outstanding on June 30, 1914, only $11,986,000 were sold, the balance remaining in the treasury or being pledged as collateral for loans. A total of $20,532,000 was spent on capital account during the year, of which $12,347,000 was for the acquisition of the St. Paul & Kansas City Short Line, the Malvern & Camden and the Rock Island, Stuttgart & Southern. Cash on hand at the end of the year amounted to $5,828,000, comparing with $5,120,000 on hand at the beginning of the year. Up to June 30 the company had borrowed $4,800,000, and the total working liabilities, including these $4,800,000 loans and bills payable, was $12,986,000. Probably the amount of loans and bills payable is considerably larger now than it was on June 30.

The Rock Island is a fine property, with very great possibilities of development. The report which was made by E. W. McKenna, until recently vice-president of the Chicago, Milwaukee & St. Paul, found that between forty and sixty million dollars ought to be spent on the property in the near future. This estimate was high. Any business man can make a study of someone else's business and discover that the other man ought to make innumerable improvements. The McKenna report was that kind of a report. No one can doubt that if $40,000,000 were available it could be spent on the Rock Island to great advantage; but few people who know the property intimately believe that any such large amount is immediately required to restore in a large measure the earning capacity of the road. A strong financial control and the sale of $20,000,000 preferred stock would put the Rock Island in an enviable position.

The following table shows the principal figures for operation in 1914 as compared with 1913:

	1914.	1913.
Average mileage operated	8,205	8,048
Freight revenue	$44,309,636	$46,428,045
Passenger revenue	18,824,651	19,777,431
Total operating revenue	68,208,113	71,364,935
Maint. of way and structures	8,838,586	9,885,324
Maint. of equipment	9,820,703	10,072,854
Traffic expenses	1,924,090	1,999,138
Transportation expenses	28,449,907	27,772,587
General expenses	1,966,660	1,774,199
Total operating expenses	50,999,946	52,504,102
Taxes	3,315,632	2,946,438
Operating income	13,892,534	15,914,395
Gross income	14,060,855	16,944,190
Net income	450,621	4,058,355
Dividends	1,871,763	3,743,525
Surplus	*1,421,142	314,830

*Deficit.

Letters to the Editor

A PLEA FOR THE YARDMASTER

MINNEAPOLIS, MINN.

TO THE EDITOR OF THE RAILWAY AGE GAZETTE:

Railroad terminals are becoming more and more important each year, and require deeper study than any other branch of railroad operation today. Business is continually increasing while terminal yards seem to grow smaller. Heretofore a yardmaster has been given slight consideration and his assistance has been classed as insignificant. Was the yardmaster ever taken into the official family and given an opportunity to discuss his problems and to help his superior officers to make suggestions to bring about changes for the benefit of all concerned? I think not. He was merely the stumbling block. The burden of blame was placed upon his shoulders and he wiggled out of it the best he knew how. But times have changed and the yardmaster has become the skilled chess master of the railroad. Today you find him rubbing elbows with everyone. His views are accepted while the officials offer him suggestions which give him a broader view and renewed courage.

My contention is that the general yardmaster needs a little diversion from his regular routine to stimulate him and show him both sides of a problem. Show me a yardmaster today who is not working hard for promotion. If this is true, why cannot our superior officers train us, as we are willing students and wish to broaden out and learn? Even though we are not promoted, the general knowledge is an education, and I know it is no burden to carry around a little new-found knowledge.

In our yard it is customary to hold yardmasters' meetings, and I can say that every man in our yard knows just as much about the work or changes as the general yardmaster. Let us see what bringing the men together means. The chief clerk in the general yardmaster's office has been taught to handle the detail work and to distribute all instructions and orders. His word is accepted by all concerned, leaving the general yardmaster free of this work.

A line up of each track in every yard and an accurate line up of all transfers from one yard to another, the number of cars and whom they are for, the amount of each kind of empties, the number of cars for all connecting lines, a list of the available engines and crews, with the time they are ready for duty and the number of cars, the tonnage and the class of freight to move, is made out in detail each morning, ready for the general yardmaster at 7 a. m. The general yardmaster puts these lists in his pocket, and no matter where he is, he can talk intelligently on any subject in the yard. Every assistant yardmaster also carries his list and there can be no dispute as to what cars he has and how many. At a glance a general yardmaster can transact such business as may be important and go to any point in the yard where his presence may be needed. Every engine foreman can tell exactly what he has in his territory and what he can do and how he can handle cars of any description. This organization today is handling more cars than ever before and every man is waiting for the end of the month to find out how much we beat the corresponding month of the preceding year.

If the yardmasters' meetings have taught us economy and team work, what would the taking in of the general yardmaster into the official family mean? It would give him ideas he never dreamed of and he in turn could educate his men to higher ideals and make his work a joy instead of drudgery. There are many good points talked over and the spirit of economy would spread not only to the yard but all over the entire system. The terminal problems would be solved and the handling of cars increased far beyond anyone's comprehension.

FRED P. GROSSMAN,
General Yardmaster, C. St. P. M. & O., Minneapolis, Minn.

A Comprehensive Low Grade Trunk Line Development

The Burlington Is Completing One Link of a New Route from Billings to the Ohio River and Denver

The Chicago, Burlington & Quincy has been working for several years on one of the most comprehensive low grade trunk line developments ever projected in this country. Briefly, this includes a low grade route from Billings, Mont., to Paducah, Ky., a distance of 1,500 miles, with a connecting low grade line from Wendover Junction, Wyo., to Denver. This line also connects, at Lincoln, Neb., with the present main line to Chicago.

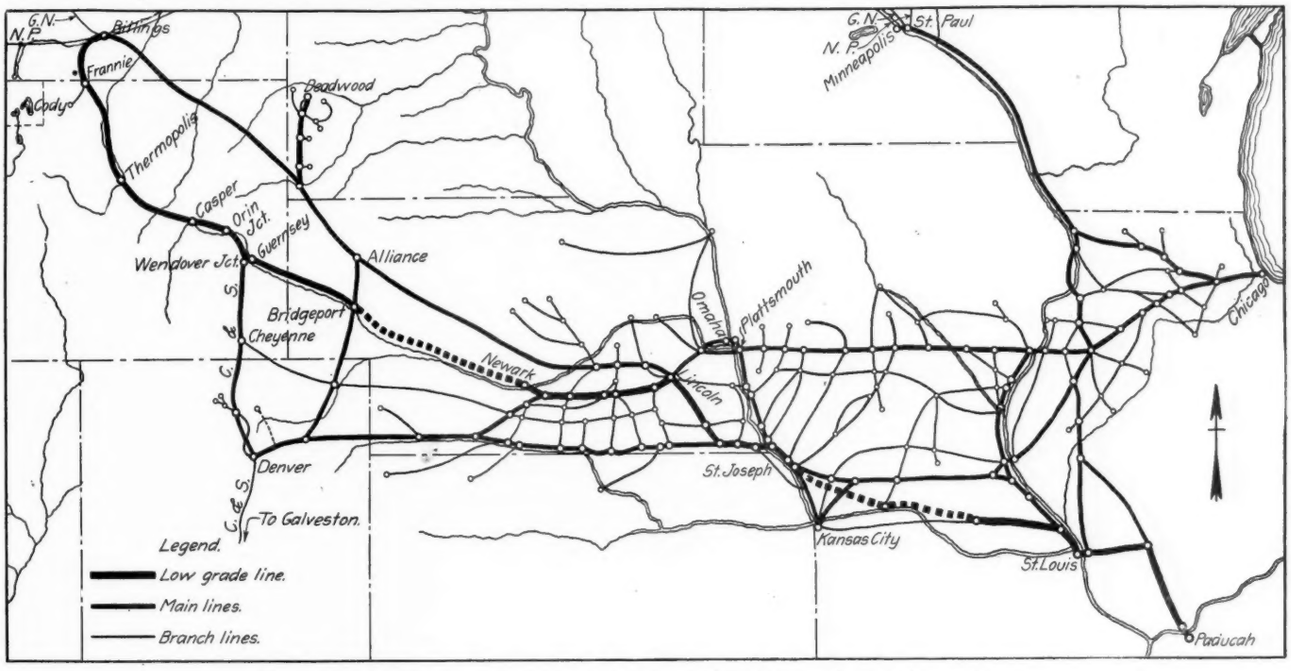
When the work is completed, the maximum grade eastbound will be 0.3 per cent from Billings south 225 miles to Alkali Summit, Wyo., 55 miles west of Casper, and 0.15 per cent from Alkali Summit to the Missouri river at Plattsmouth, Neb., a distance of 674 miles, with practically no adverse grade. From Plattsmouth there will be a maximum grade of 0.3 per cent to Paducah. Westbound this maximum grade has been established at 0.4 per cent from Paducah west to Lincoln, Neb.; 0.3 per cent from Lincoln to Casper, Wyo., and 0.45 per cent from Casper to Alkali Summit. From Alkali Summit to Billings there is practically no adverse grade, with the exception of 35 miles of 0.5 per cent ruling grade from Kane, Wyo., 80 miles southeast of Billings, to Warren, and this will probably be operated as a helper grade. The ultimate plans also provide for a low grade line with a maximum grade of 0.5 per cent from a connection with the Billings-Paducah line, 120 miles north of Cheyenne, Wyo., south via Cheyenne to Denver. As the Burlington is controlled jointly by the Great Northern and the Northern Pacific, and as it in turn controls the Colorado & Southern, this will give the Hill lines direct low grade outlets from Puget Sound points to the Ohio river and to Denver, with the possibility of also securing a low grade outlet to Galveston by reducing the grades on the Colorado & Southern.

The carrying out of the project involves the use of the tracks of the Northern Pacific from Billings south 37 miles to Fromberg, Mont.; the construction of a new line from Fromberg southeast 358 miles to Orin Junction, Wyo.; the use of the Colorado & Southern line from Orin Junction southeast 31 miles to Wendover Junction; the construction of a new line from this point east 8 miles to Guernsey, Wyo.; the use of the present Guernsey branch of the Burlington southeast 98 miles to Bridgeport, Neb.; the construction of a new line from Bridgeport southeast along the North Platte to Newark, Neb., 232 miles; the use of the present line of the Burlington from Newark via Lincoln and Plattsmouth to St. Joseph, Mo.; the construction of a new line from St. Joseph, Mo., to Mexico, Mo., about 200 miles, and the use of existing lines from that point to the Ohio river at Metropolis, Ill., where work has been started on the construction of a new bridge to cross the river and a 12 mile extension to enter Paducah, Ky.

COMPARISON OF NEW AND OLD LINES

Billings has been an important gateway to the northwest for many years. Here the Burlington connects with the Northern Pacific and the Great Northern for Spokane, Seattle and other western points. Since the acquisition of the Burlington by these two roads the amount of traffic exchanged with it at Billings has increased materially. The importance of a low grade line from Billings to points in the central states is, therefore, evident. The present line from the Missouri river, via Lincoln, Neb., and Alliance, is one of relatively high grades, ranging from 1 per cent to 1.6 per cent, with many of 1.25 per cent, especially west of Edgemont, North Dakota.

The new line will avoid these heavy grades and have practically no greater mileage. It will also open up a large territory in northern and central Wyoming, which is now entirely without railroad facilities. While largely a grazing territory, this section is now being rapidly settled up, especially in the Big Horn valley. This line will also provide a new route from Denver to the northwest. At the present time the Burlington handles traffic between Denver and Billings via



Map of Burlington Lines Showing Relation of New Line to Remainder of System

Brush, Colo., and Alliance, Neb. The new line will provide a route of lower grades and is about 75 miles shorter.

At present this new low grade route has been completed and is in operation from Billings south to Orin Junction, where connection is made with the Colorado & Southern. A new line has also been built from Cheyenne to Fort Collins, Colo., completing the new outlet to Denver, although considerable grade reduction work will have to be done on the Colorado & Southern north of Cheyenne. A cut-off is projected from Greeley, Colo., on the Colorado & Southern south to Hudson on the Burlington to complete the low grade line into Denver.

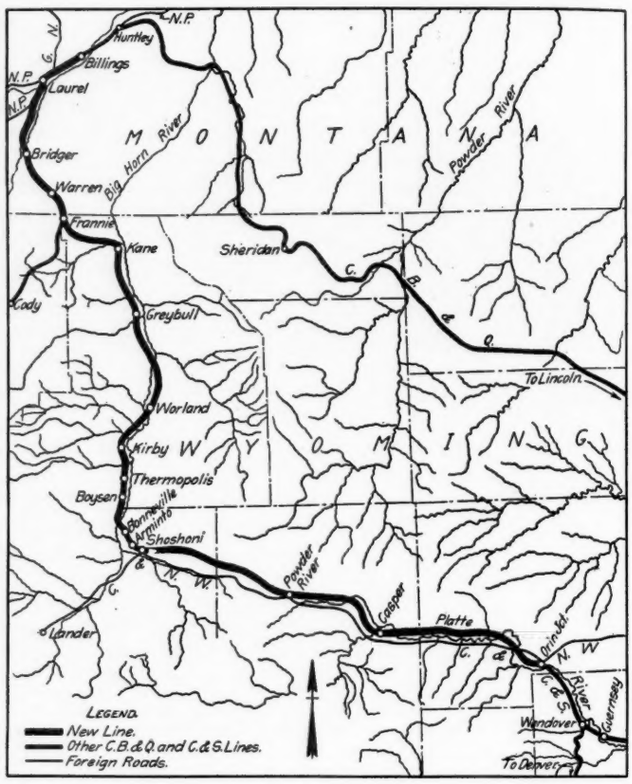
Work was started but is now temporarily discontinued on the construction of an 8 mile connection from Wendover Junction, Wyo., to Guernsey, where a connection is made with the present 0.3 per cent line to Bridgeport. From Bridgeport to Newark no work has been authorized, up to this time, but the construction will be light, as the line will follow the North Platte river for the entire distance. Nothing has been authorized between St. Joseph, Mo., and Mexico, but as stated above, work has recently been authorized between Metropolis, Ill., and Paducah, Ky. It will be seen that work either has been completed or is under way on all but two portions of this 1,500 mile line. West of the Missouri river the only gap is that between Bridgeport and Newark, 232 miles, and an alternate line can be used via Alliance and Lincoln, which is but 45 miles longer, although with heavier grades.

WIND RIVER CANYON

The most interesting portion of this entire project from an engineeering and construction standpoint is that between Billings and Casper and especially that portion south of Thermopolis, Wyo., which was completed late last year. Immediately south of Thermopolis the line passes through Wind river canyon for 12 miles, involving some very heavy construction work costing about $250,000 per mile.

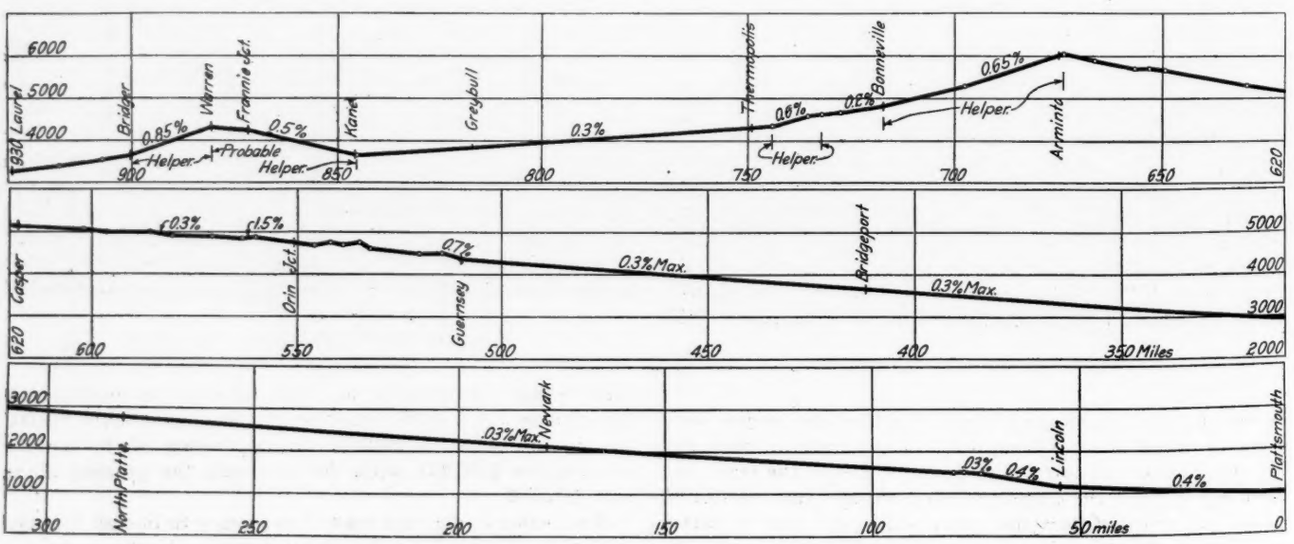
The maximum grades have been given above and are also shown on the profile. The maximum curvature is 1 deg. 30 min. from Orin Junction west to Casper, and 2 deg. west of Casper, with the exception of four 4 deg. and one 3 deg. curves in the canyon.

The heaviest work on the entire line was encountered in Wind river canyon, starting at a point 4 miles south of Thermopolis, and extending south 12 miles to Boysen. At this point the Big Horn or Wind river has cut a narrow channel through a heavy rock formation, forming a gorge 900 ft. deep and in many places less than 200 ft. wide at the bottom. The ruggedness of this canyon and the problems encountered in construction are indicated by the difficulty of locating the line. It was necessary to make the location in the winter in order to get into the canyon on the ice, as there was only one point at which it was possible to descend into it from the top. The presence of several springs along the lower 2 miles made it impossible to work there even on the ice. There was only one point at which the stream could be forded. At times the locating parties were able to spend only one to two hours a day at the work, the remainder of the time being taken in getting in and out. A site for a camp was finally selected in the canyon, and it required a pack train of five burros an entire week to move the camp and provisions a distance of six miles, and cost $165.



New Burlington Line from Billings (Mont.) to Orin Jct. (Wyo.)

The contractors encountered the same difficulty later in



Profile of New Burlington Low-Grade Line from Laurel (Mont.) to Plattsmouth (Neb.)

getting in their equipment and supplies, one man spending a month on the construction of a pack trail in from the north end to his camp. Eventually a trail was completed on the opposite side of the canyon from the line at a cost to the contractors of over $10,000 for the 12 miles. Because of the lack of room beyond the limits of the excavation all camps were established on the opposite side of the canyon from the line. Several cable suspension bridges were erected across the stream by which men and supplies were brought in to the work. The contractors employed a pack train of 40 burros continuously to bring in their supplies. One Japanese sub-

Rock Fill Across Channel of Big Horn River, North of Thermopolis

contractor also lowered considerable material over the cliff with ropes.

The line was located on the west side of the canyon for the entire distance, as it was possible to secure a somewhat better location as regards curvature, as well as to protect it better against the river. The presence of a small dam for power development at the upper or south end of the canyon required the adoption of a 0.6 per cent grade through the canyon, where a 0.5 per cent line could otherwise have been built at a saving of $150,000.

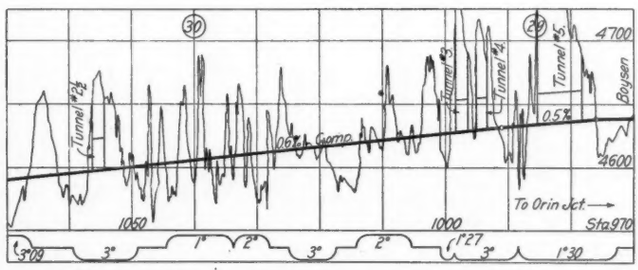
Because of the inability to get heavy equipment in to the scene of the work all material was handled by hand, being hauled out on the fills in many cases in small carts. In constructing the fills a narrow bank was first made with the heavi-

Heavy Work in the Canyon

er rock on the outside to protect it against the stream until it was widened to its full section. At one point a "shoo fly" line was located around a high point, and after the track had been laid through the canyon a steam shovel removed 170,000 cu. yd. of material from this point which was used to widen the embankments to their full section. By this means, the use of rip rap as such was avoided, although the toe of the slope was in the stream for almost the entire distance.

The cuts averaged in general from 100 ft. to a maximum of 238 ft. in height on the high side. In numerous instances they were "daylighted" and the material later placed in the fills. There was some trouble with loose or sliding materials, in which cases it was necessary to remove all this material from the face of the cliff.

In one instance a contractor removed a heavy rock face entirely in a single shot. He drove a tunnel 50 ft. into this face at the center, and then 50 ft. at right angles in each direction, loading it with 60 per cent dynamite and powder. The preparation of this shot, including the explosives, cost



Profile of Heavy Two-Mile Section in the Canyon

$3,500, while the blast threw 8,000 cu. yd. of rock into the adjoining fill, and brought down over 22,000 cu. yd. additional, 15,000 yd. of which was later placed in the embankment.

At another point, the shooting down of a vertical face 125 ft. high completely blocked the river for a time until the water had risen 8 ft., when it cut a channel 65 ft. wide through the debris. The narrowing of the channel at various points through the entire canyon has resulted in a noticeable rise in the surface of the stream.

Six tunnels were constructed in the canyon, the longest of which was 725 ft. The most northerly one was taken out entirely by hand. It was possible to operate air drills at the others, the contractor erecting a compressor plant at the north end of the south or longest tunnel, which was located at the south end of the canyon. Four tunnels were located in the southerly two miles of line in the canyon, three of which were within a distance of 2,000 ft. It was at this point

Trapping Side Hill Debris into Small Cars

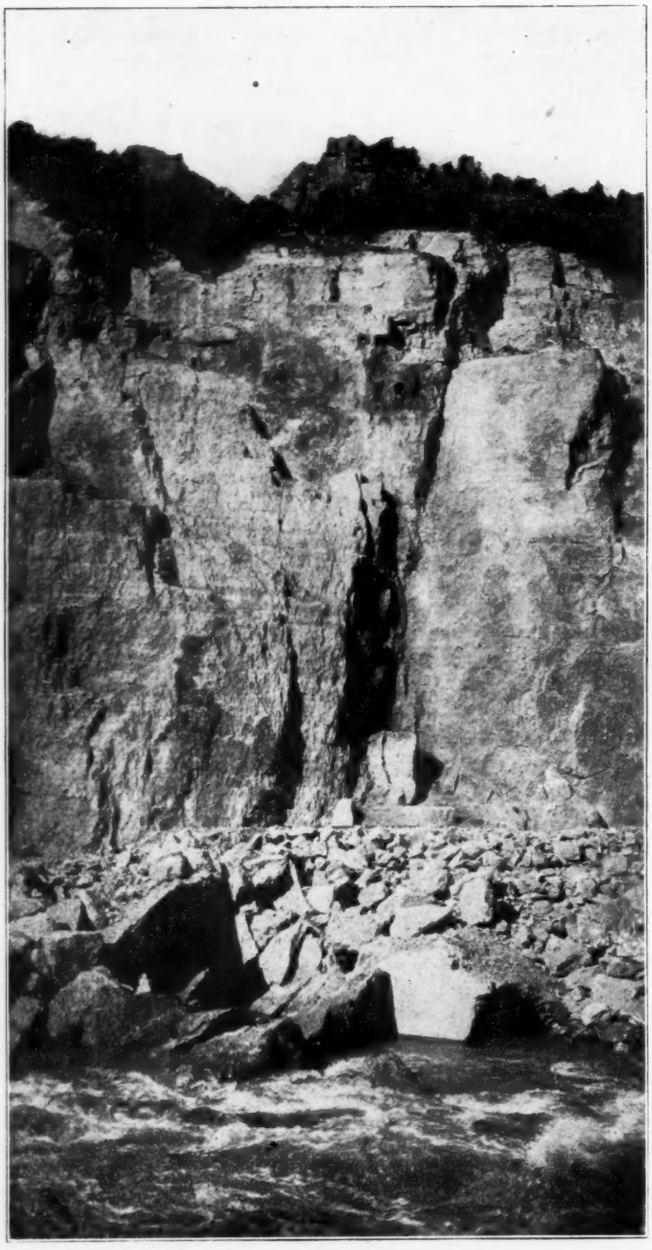
that the heaviest work in the entire canyon was encountered, the grading for 3 miles requiring the moving of over 425,000 cu. yd. of rock, in addition to the driving of the tunnels, and costing $450,000, while for one mile the grading alone cost $210,000.

Mud seams in the rock made it necessary to line all the tunnels throughout, except the long tunnel, only the portals of which were timbered. The timber lining for the two norther-

ly tunnels was placed by company forces, while the others were timbered by the contractors as the work progressed. The character of the rock encountered in driving these tunnels and the excavation in the canyon varied widely. At the north end a soft sandstone was found which changed to a hard sandstone, and then to a limestone. At the northerly tunnel a red granite was found, which gave way to a very hard black dyerite near the south end of the canyon.

BOYSEN TO ORIN JUNCTION

Leaving the canyon, the line follows Wind river for 10 miles south of Boysen. It then swings to the east on a 40



After the Heavy Shot was Fired, Bringing Down 30,000 cu. yds. of Rock

min. curve two miles long and follows Badwater creek for 24 miles, after which it ascends Alkali creek to Alkali Summit. In this section there was no work of special interest, the material generally encountered being a clay, with shale in some few instances.

At Alkali Summit a tunnel 830 ft. long was driven through a moderately soft sandstone. Work was carried on from the east end only, and all drilling and handling of material were done by hand. The wall plate drifts were first driven on each side, after which the center section was removed and the full arch centers placed. The bench was then removed in two lifts, the material being loaded in standard gage dump cars. The tunnel has recently been completed and it is now being lined with concrete deposited by air from a mixer located on a car, as described in the *Railway Age Gazette* of November 20.

From the summit to Powder river the work was generally light and presented no special problems. From Powder river to Casper the line follows Casper creek, from which point it parallels the North Platte river to Orin Junction. Ultimately this line will follow the North Platte river from Casper, Wyo., to Newark, Neb., a distance of 437 miles. The grading between Powder river and Orin Junction was mostly earth and amounted to over 5,000,000 cu. yd., the greater part of which was handled by teams.

In a number of instances the force of streams was utilized in an interesting manner in cutting their own channels. Three miles north of Thermopolis it was necessary to change the channel of the Big Horn river, as Wind river is known north of the canyon, to avoid two crossings of the stream. To

North Portal of the Long Tunnel—Boysen Dam at the Left

move the river a small ditch was dug at the proposed location of the stream. A fill of heavy rock was then constructed from the upstream bank on the center line of the road, the forward end of the dumping trestle being carried on a boat. As the fill progressed, the stream was crowded over into its new course and cut its own channel. Under similar conditions one mile south, the old channel was shut off and the stream forced to a new location by sinking a timber crib in the channel, while one mile south of Thermopolis end dumping cars were employed in building an embankment in the channel.

At Bonneville Badwater creek ran close to the line for over one mile, and threatened to cause serious damage at flood stage. A ditch 10 ft. wide was dug some distance from the track with a small dike on the track side. On the first heavy storm the water started down this ditch, widening it to 100 ft., and deepening it so that a permanent channel was established, and danger of further trouble was eliminated. The same plan was adopted at Fetterman, where a drag line excavated a 50 ft. channel for the North Platte river, which the river itself has since widened to accommodate its entire flow.

The bridge work on this line was relatively light. Wind

river is crossed twice at the north end of the canyon and once at the south end on permanent structures. The south Powder river is crossed at Powder river on a high framed timber trestle, and the North Platte is crossed just above Casper on a timber structure. Between Casper and Orin Junction the line crosses the North Platte river four times on permanent bridges. Numerous smaller streams and ravines are crossed by pile bridges. Whenever it was possible to haul material in to the line, cast iron pipe was used for small openings; where pipe was inserted after the track was laid, concrete pipe was used.

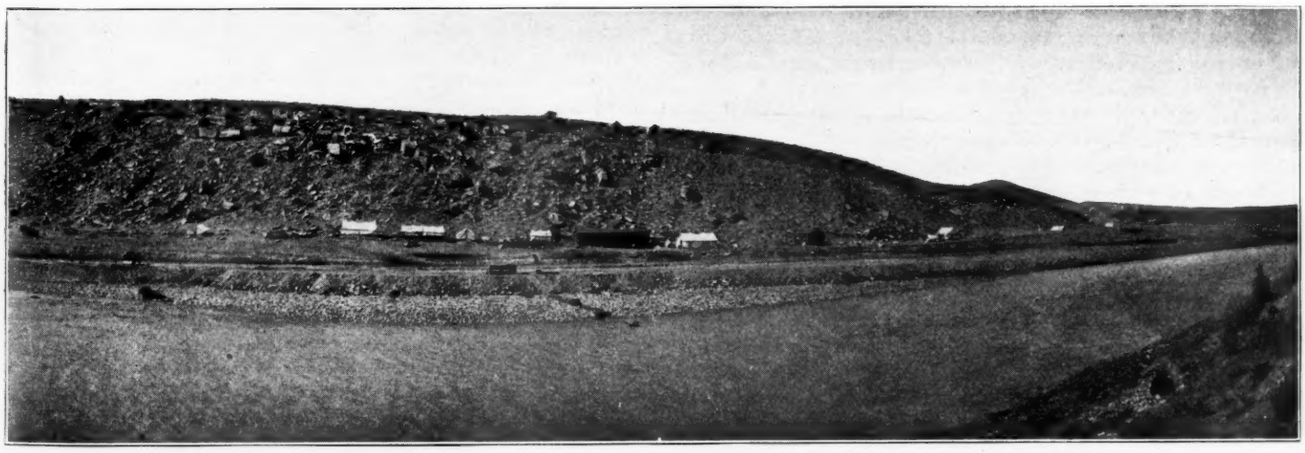
Leaving the South End of the Canyon

It was necessary to give close attention to the development of water supplies, both for use during construction and for permanent operation. South of the canyon all water is highly alkali for a considerable distance, rendering it unsuitable for camp use. A large spring of good drinking water was found 1,000 ft. above the grade line, four miles north of the south end of the canyon, and the water from this point was hauled to all the camps along the line. This water was not suitable for boiler use, however, and a pumping station was erected at Boysen during the early stages of the construction. Water secured from Wind river at this point was hauled for the steam shovels working along the line as far south as 62 miles.

In addition to the water station at Boysen permanent supplies have been secured from surface reservoirs at Bonneville, Lysite, Arminto (Alkali Summit) and Powder river, all of which are gravity supplies, except the last. At Powder river the water is impounded by the roadbed embankment, while at the other points reservoirs have been constructed away from the line. At Lysite a six-inch wood stave pipe line was laid from the reservoir to the tank, but all the others were of cast iron. Between Casper and Orin Junction water is secured directly from the North Platte river.

Division terminals have been established at Greybull, 112 miles south of Laurel; at Bonneville, 100 miles further south, and at Casper 100 miles southeast of Bonneville. Passing tracks 4,000 ft. long have been built at intervals of 10 miles, with provision for one every five miles eventually. Slack grades have been introduced at all passing tracks.

The track is laid with second-hand 75 lb. rail west of Casper and new 90 lb. rail east of that point, with square joints on tangents and staggered joints on curves. Treated ties are laid on gravel ballast secured from a pit four miles north of Thermopolis, and another near Casper. Tie plates are used on all ties. The track was laid with a McCabe & Steen track-laying machine, which has laid an average of 7,500 ft. of track daily with a gang of 115 men.



Striking Lighter Work a Short Distance Out of the Canyon

Work on this extension south from Thermopolis to Powder river was started in 1909, and was completed late last year.

The section from Powder river to Orin Junction was started last year. Between Wendover Junction and Guernsey, the contractor has begun driving three tunnels, 3,052, 1,600 and 1,900 ft. in length, respectively.

This entire project has been developed under the direction of T. E. Calvert, chief engineer. A. L. Hoagland is engineer in charge of construction, and C. H. Cartlidge, bridge engineer, has been in charge of the design and construction of all bridges. MacArthur Brothers of New York were the contractors for the construction of the line from Thermopolis

Channel Created by One Storm at Bonneville

to Powder river, and Twohy Brothers of Portland, Ore., did the grading of that part of the line from Powder river to Orin Junction. Kilpatrick Bros. & Collins, of Beatrice, Neb., have the contract for the work between Guernsey and Wendover. Including the station men in the canyon McArthur Brothers had 86 sub-contractors on their part of the work at one time. All track and bridge work was handled by company forces.

REVIEW OF CANAL TRAFFIC

[From the Canal Record]

During the period of two months, from August 15 to October 15, that the Panama canal has been open to traffic, the commercial vessels which have been using it have carried through 583,949 tons of cargo. The traffic has followed fairly well defined trade routes, and the course of the great majority of vessels may be roughly classed in four great groups.

The heaviest traffic has been between the Atlantic and Pacific coasts of the United States. Manufactured goods of great variety and general merchandise are carried from the Atlantic seaboard, principally from New York, and secondarily from Boston, Philadelphia and New Orleans, to the principal California and Puget Sound ports; also, to Honolulu. On the eastbound voyage, these vessels carry chiefly canned fruits, vegetables and salmon, lumber, grain, sugar, pineapples and wine. This trade is restricted to vessels of American registry, and nearly all the American vessels which have used the canal have been engaged in it. During the period of canal operation, 24 vessels have passed through eastbound on this route with 151,290 tons, and 25 westbound with 135,214 tons. These passages, 49 in all, have constituted approximately 44 per cent of all the 113 passages through the canal. The total cargo carried on this route, 286,504 tons, has been almost exactly 50 per cent of all cargo.

A route between the eastern coast of the United States and the west coast of South America has been second in cargo through the canal. Northbound vessels carry principally nitrates from the fields of Chile, with secondary cargo of raw material products of the western countries of South America, and southbound vessels carry manufactured goods from the United States and Europe. The northbound traffic, passing 13 vessels with 93,139 tons through the canal during the two month period, has considerably exceeded the southbound, consisting of three vessels with 18,800 tons, and one in ballast, though the latter seems to be getting under way.

There has been a marked, though probably seasonal, traffic from the Pacific ports of the United States and southwest Canada to Europe with grain. Ten vessels, each heavily laden, have gone through eastbound, with 71,560 tons, and eight vessels, all of foreign registry, have gone from the Atlantic to the Pacific in ballast, to return on this route with grain. In addition, one vessel, which went through the canal with 6,000 tons of manufactured goods, from Antwerp to Tacoma, is to return with grain.

The fourth great route has been from the Atlantic seaboard of the United States to China and Japan, with refined petroleum in bulk and in cases, and other petroleum products. Four vessels have gone through in this trade from the Gulf of Mexico, with 24,931 tons, and four from Philadelphia and New York, with 26,570 tons, an aggregate of 51,501 tons. No vessels have gone in the other direction on this route.

Next to the four principal routes just described, the most notable development has been the coal traffic from the middle Atlantic seaboard of the United States to the Pacific coast of North and South America. Five vessels, four from Norfolk, with 22,535 tons, and one from Baltimore, with 6,000 tons, have carried coal to the upper Pacific, and one vessel from Baltimore has carried 6,010 tons to Valparaiso. The total coal carried has been 34,545 tons. None of these vessels have returned through the canal to this time, but it is understood they will load with Pacific coast products for the eastern United States and for Europe.

The development of a line from Liverpool around South America, with vessels sailing both ways, via the canal, has been arrested by the European war. The only vessel to have used the canal in this route was the steamship Potosi, which passed through the canal on September 25, on its way south, along the west coast of South America. It was held in the bay at Balboa, awaiting orders, but sailed on October 14.

The steamship Desabla, which passed through the canal on October 12, in ballast, was on its way from Rio de Janeiro to San Pedro for a cargo of fuel oil.

The military service of the United States has used the canal for the passage of one army transport and one navy collier, both from Pacific to Atlantic.

In the week from noon, October 20, to noon October 27, following the resumption of traffic through the canal after the opening of the channel opposite the new Culebra slide, 17 vessels were put through the canal from the Pacific to the Atlantic, and 21 from the Atlantic to the Pacific, a total of 38 vessels in seven days. Up to the end of the week, 71 commercial vessels and three launches had passed through the canal in the 27 days of October. The tolls collected on tonnage in this period amounted to $329,704.72, as compared with the total of $369,706.29 collected prior to October 1, in which are included charges for 115 barges towed through the canal before its formal opening to commercial traffic on August 15.

EXPORTS OF CARS AND LOCOMOTIVES.—The Wall Street Journal has compiled figures showing that in September, 1914, there were 19 locomotives, having a value of $129.193, exported from this country, as compared with 38 locomotives exported in September, 1913, having a value of $360,788. In the nine months ending on September 30, 1914, the exports of locomotives numbered 222 and their value was $2,240,959, whereas in a like period in 1913, there were 383 locomotives exported, having a value of $3,447,798. The falling off in exports of cars for steam railroads was even larger in proportion than that in locomotives. In September this year the total value of cars exported was $119,531, including those for passenger service. This compares with $929,037 for the same month of last year. The decrease for the nine months period is even greater, the exports in 1914 being valued at $2,303,123 as compared with $9,288,378, four times as great.

Pacific Type Locomotives for the Clinchfield

Designed for Moderate Speed Service on Heavy Grades; Weight on Drivers, 176,900 lb.; Tractive Effort, 46,000 lb.

The Carolina, Clinchfield & Ohio traverses a mountainous country, and although steep grades were avoided as far as possible during its construction, it is far from level. There are numerous grades from 0.5 to 0.8 per cent, the maximum for a comparatively short distance being 1.7 per cent, while one of the hardest stretches is an unbroken grade of 1.2 per cent approximately 20 miles long. On a line of this character, passenger service is necessarily worked at moderate speeds over the greater part of the distance and the locomotives employed must have capacity to maintain a high drawbar pull for sustained periods, rather than the ability to run at unusually high speeds. This requires sufficient starting tractive effort, backed by ample boiler power to maintain full steam pressure when working with a relatively long cut-off at moderate speeds.

These qualities are realized in two designs of Pacific type locomotives built for the road by the Baldwin Locomotive Works in 1910 and 1914, and known respectively as classes P-1 and P-2. Three of the former and two of the latter are in service. The leading dimensions of these locomotives are as follows:

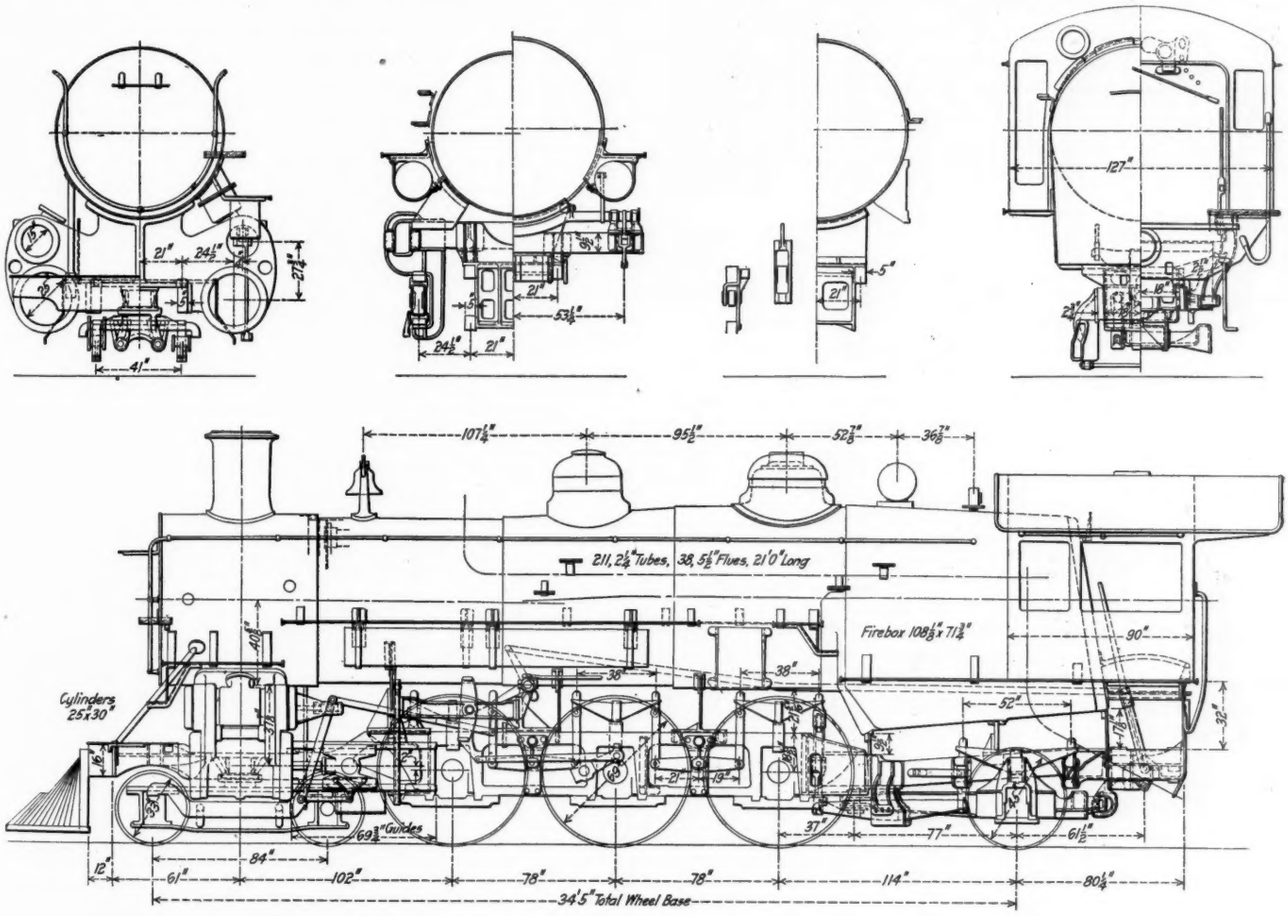
Class	Cylinders	Drivers, diam.	Steam pressure, lb.	Grate area, sq. ft.	Water heating surface, sq. ft.	Superheating surface, sq. ft.	Weight on drivers, lb.	Weight total, lb.	Tractive effort, lb.
P-1	23 in. x 30 in.	69 in.	190	54	4,095	...	152,900	233,050	37,200
P-2	25 in. x 30 in.	69 in.	200	53.8	3,982	955	176,900	280,300	46,000

In both these designs, the weight available for adhesion is fully utilized. This is especially true of class P-2, which, as far as tractive effort is concerned, is one of the most powerful six-coupled locomotives thus far built.

The boiler of the class P-2 locomotive is of the extended wagon-top type, 85⅞ in. diameter at the largest course, and is fitted with a 38-element superheater of the Schmidt type; the furnace equipment includes a brick arch. The design has been so worked out that a Hanna stoker can be subsequently applied should such equipment be found necessary. The construction of the boiler is in accordance with the regular practice of the builders, and presents no unusual features of design.

The cylinders have Sheedy by-pass valves and graphite lubricators. The cylinder and steam chest bushings are of Hunt-Spiller metal, as are also the bull-rings and packing rings used in the valves and pistons. The piston heads are of the built up type, with cast steel bodies of dished section to which the bull-rings are riveted. The valves have cast iron bodies, and the bull-rings are carried on cast steel spiders. The valve motion is of the Walschaert type, and the valves are set with a lead of ¼ in. The locomotive is balanced according to the Master Mechanics' Association rule, and careful attention was heen given to the design of the reciprocating parts in order to eliminate unnecessary weight. The driving-tires, driving-axles, and crank pins, are of chrome vanadium steel, and the engine springs and frames are of steel with vanadium content.

The main frames are 5 in. wide, with single rail sections 12 in.



Elevation and Sections of Pacific Type Locomotives for the Carolina, Clinchfield & Ohio

deep under the cylinder castings. The guide yoke is bolted to a steel casting which has long bearings on the upper frame rails, and extends the full depth of the leading driving pedestals. Midway between the first and second pairs of driving wheels is placed another broad casting, supporting a transverse plate to which the link and reverse shaft bearings are bolted. This casting also supports a boiler waist sheet. A similar casting is placed between the main and rear pairs of driving wheels, and a deep brace is placed at the main driving pedestals. The rear driving pedestals are braced by a large casting, which carries the radius bar pin for the trailing truck. This casting also has bolted to it a vertical expansion plate which supports the front end of the mud ring. The rear end of the mud ring is supported in a similar manner by a plate which is bolted to the foot plate.

The tender wheels are steel tired, and the trucks both have side bearings. The tender frame is composed of 12 in. channels, the center sills weighing 40 lb. per foot and the side sills 25 lb.

On the basis of tractive effort, the class P-2 locomotives rank with many large Consolidation and Mikado type engines employed in heavy freight service.

The following table gives the principal dimensions and data:

General Data

Gage	4 ft. 8½ in.
Service	Passenger
Fuel	Soft coal
Tractive effort	46,000 lb.
Weight in working order	280,300 lb.
Weight on drivers	176,900 lb.
Weight on leading truck	52,300 lb.
Weight on trailing truck	51,100 lb.
Weight of engine and tender in working order	435,000 lb.
Wheel base, driving	13 ft.
Wheel base, total engine	34 ft. 5 in.
Wheel base, engine and tender	66 ft. 9¾ in.

Ratios

Weight on drivers ÷ tractive effort	3.84
Total weight ÷ tractive effort	6.09
Tractive effort × diam. drivers ÷ total equivalent* heating surface	5.86
Total equivalent* heating surface ÷ grate area	100.5
Tube heating surface ÷ firebox heating surface	17.9
Weight on drivers ÷ total equivalent* heating surface	32.6
Total weight ÷ total equivalent* heating surface	51.8
Volume both cylinders, cubic feet	17.06
Total equivalent* heating surface ÷ vol. both cylinders	317
Grate area ÷ vol. cylinders	3.16

Cylinders

Kind	Simple
Diameter and stroke	25 in. by 30 in.

Valves.

Kind	Piston
Diameter	15 in.
Lead	¼ in.

Wheels

Driving, diameter over tires	69 in.
Driving, thickness of tires	3½ in.
Driving journals, main, diameter and length	11½ in. by 13 in.
Driving journals, others, diameter and length	11 in. by 13 in.
Engine truck wheels, diameter	33 in.
Engine truck, journals	6½ in. by 12 in.
Trailing truck wheels, diameter	45 in.
Trailing truck, journals	8 in. by 14 in.

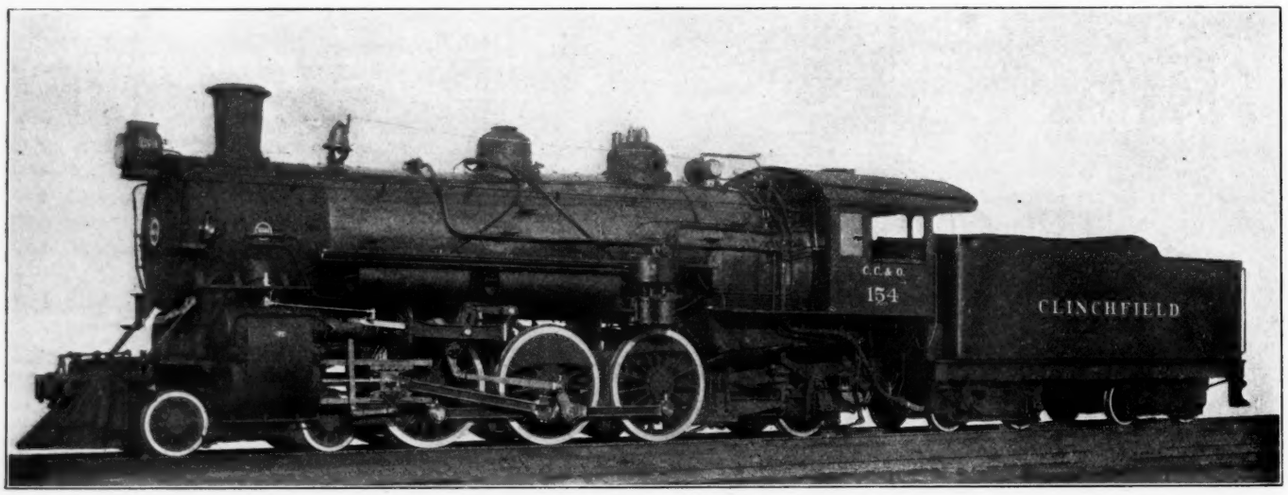
Boiler

Style	Wagon top
Working pressure	200 lb.
Outside diameter of first ring	78 in.
Firebox, length and width	108⅛ in. by 71¾ in.
Firebox plates, thickness, sides and crown, ⅜ in.; back, 5/16 in.; tube, ½ in.	
Firebox, water space	Front, 5 in.; sides and back, 4 in.
Tubes, number and outside diameter	211, 2¼ in.
Flues, number and outside diameter	38, 5½ in.
Tubes, length	21 ft.
Heating surface, tubes	3,744 sq. ft.
Heating surface, firebox	208 sq. ft.
Heating surface, firebox tubes	30 sq. ft.
Heating surface, total	3,982 sq. ft.
Superheating surface	955 sq. ft.
Total equivalent* heating surface	5,414 sq. ft.
Grate area	53.8 sq. ft.
Smokestack, diameter at choke	19 in.

Tender

Wheels, diameter	36 in.
Journals, diameter and length	5½ in. by 10 in.
Water capacity	8,000 gal.
Coal capacity	14 tons

*Total equivalent heating surface = evaporative heating surface + 1½ times superheating surface.



Carolina, Clinchfield & Ohio Pacific Type Locomotive

THE OPERATION OF A BUSY FLAT YARD*

By R. R. Farmer

Trainmaster, Missouri, Kansas & Texas, Parsons, Kan.

In the operation of a flat yard, the terminal for six divisions, handling an average of 1,800 cars per day, and with a total car capacity of yard tracks of 840 cars, it is absolutely necessary to keep all cars moving. The average number of trains in and out of this terminal each day is 58 freight and 38 passenger trains, making a train movement in or out every 15 min. and a freight train movement each 28 min. The average amount of terminal overtime is 1 hr. and 30 min. daily.

All trains are broken up, switched and started from this yard. Trains arriving are carded by the carding clerks. After checking the waybills seal clerks and car repairers go over the trains and card all heavy repair cars with full bad order cards and all light repair cars with one-half bad order cards. The trains are then pulled up over the lead, broken up and switched to the various tracks. All heavy repair cars are taken to the car shops and the light repair cars are placed on light repair tracks contiguous to the yards. All cars are classified to the various tracks for the different divisions, which necessitates holding tonnage for some divisions from three to eight hours to get full trains for the slow service freights and to protect tonnage of high class freight such as stock or fruit.

The yard is equipped with an air compressor plant and all train tracks are piped so that the air test may be made by inspectors before the road engine is placed on the train. All crews are required to be in attendance 30 min. before the time

*A paper submitted in the Terminal Yard Contest.

called to leave. We use no engine herder, the head breakman taking the engine to and from the house, leaving it 30 min. before the departure of the train.

The yard force consists of one general yardmaster day and night, one assistant yardmaster day and night, one yardmaster's clerk day and night, who handles all crews and directs the calling of crews, keeps all stock records, terminal delays and rest records; a chief register clerk day and night, with one assistant; two sealers day and night, two carders, one weighmaster and a diverting clerk day and night.

The yardmaster personally checks all details which are furnished from the terminal or point where the train originates, showing loading time on all stock and the release information, etc. This enables him to determine the amount of tonnage and the commodities that are en route to the terminal from four to six hours in advance. Twenty-five per cent of the trains passing the terminal are allowed only 45 min. in the yard and 25 per cent are allowed 1 hr. and 30 min. This includes the time for the trains to be broken up and switched and the re-icing of meats and other perishables, 3 min. per car being allowed for re-icing, which includes all time consumed in spotting the cars to the icing station, re-icing and the air test.

The foreman of the lead engines keeps a check of all tonnage on the various tracks as it is classified, both short and through, which can be furnished to the yardmaster at any time, and is furnished every hour. The yard is equipped with a telephone system with bells at intervals of 150 ft., and telephones are located at convenient points so that the yardmaster is in touch with the engine foremen at all times, and at all points in the yard.

The yardmaster's office is located in the second story of a two-story building at one end of the yard, the first floor being occupied by the operators and yard clerks, and messages being handled from one floor to the other by means of a dumbwaiter. The location of this office gives the yardmaster a full view of the yard and the telephones with the various bells enable him to direct the work of any crew working in the yard at any time.

The yardmaster confers with the chief despatcher frequently by telephone, and at 4 o'clock each evening the chief despatcher furnishes a "starting sheet" to the yardmaster, assistant yardmaster, engine foreman, callers, roundhouse foreman, register clerks and car inspectors, containing general instructions, car orders, special services to be performed, work trains, special cars, and movements of circuses or show troops. This starting sheet usually contains from 30 to 70 special orders. Copies of the starting sheet for the engine foremen are sent to the yardmaster, who checks off the work for the various engines and the foremen are instructed in the work assigned to their engines. As the work is done it is reported hourly to the yardmaster and is checked off on his sheet. This sheet is checked by the yardmaster personally at 7 p.m., 12 midnight, 7 a.m. and 12 noon, and on the last check any work that has not been done is placed on the delay pickup sheet which is used between 12 o'clock noon and 4 p.m. All work that has not been done and cars that have not been gotten out are then given preference over other work.

All foreign cars arriving under load destined to this terminal without home route cards are placed for unloading and immediately on their arrival telegraphic request is made for the home route so that the cars may be moved home promptly when released. All cars passing the terminal destined to stations on the district under the same jurisdiction as the terminal, have a slip attached to the billing instructing the agent at destination to wire for the home route as soon as the car arrives. All bad order cars under load are reported to the chief register clerk by the yard inspector, who "bad orders" the car on a slip showing the number and initial of the car, whether or not a transfer of the load will be necessary and whether the car requires light or heavy repairs. The register clerk then makes copies of this slip in triplicate, sending one copy to the yardmaster, one to the car accountant and one to the foreman of either the light or heavy repair track, as the case may be. When the car is "O. K.'d" on the repair track, the foreman of the repair track fills out the slip showing the time the car was set and the time O. K.'d and sends the slip back to the register clerk, who takes the bill out of the bad order box. The yardmaster is then furnished with this notice after the register clerk has signed it, and checks for the car in the classification tracks after the repair tracks have been pulled. The car accountant holds his slip until the yard is checked at 8 a.m. the following day, and if the car is still on hand advises the yardmaster and trainmaster and the foreman of the car department that the car has been in the yard 12 hours for repairs. All repair tracks are pulled at 12 noon and at 6 p.m. Light repair tracks are also pulled at 12 midnight. With the heavy power and heavy tonnage on this line the average number of bad order cars repaired at the terminal is about 5,000 per month and the average cost of handling cars is about $0.20 per car, which includes wages and fuel.

All engines are assigned to regular work on a ten-hour basis, taking the meal hour in the sixth hour. In order to keep engines in the yard at all times, this necessitates starting them at 6, 7 and 8 o'clock. This system has a tendency to keep down overtime and is more satisfactory to the men, as it enables them to have regular meal hours and the senior men in the service have the engines with the best hours, so they can be at home at the most desirable part of the day.

We make our own switchmen to a great extent by promoting yard clerks and young road brakemen and use great discretion in employing experienced men for the positions of engine foremen. As a rule too little attention is paid to this most important feature. The engine foreman is the one man in the organization that the greatest care should be taken in choosing. He should not be too old or too young and should be cool-headed, steady and sober and should have a fair education. As a rule our yardmasters are chosen from the ranks. They must be instructors as well as governors and must have tact, enthusiasm, friendliness and patience. They must be honest and loyal, and be organizers and disciplinarians.

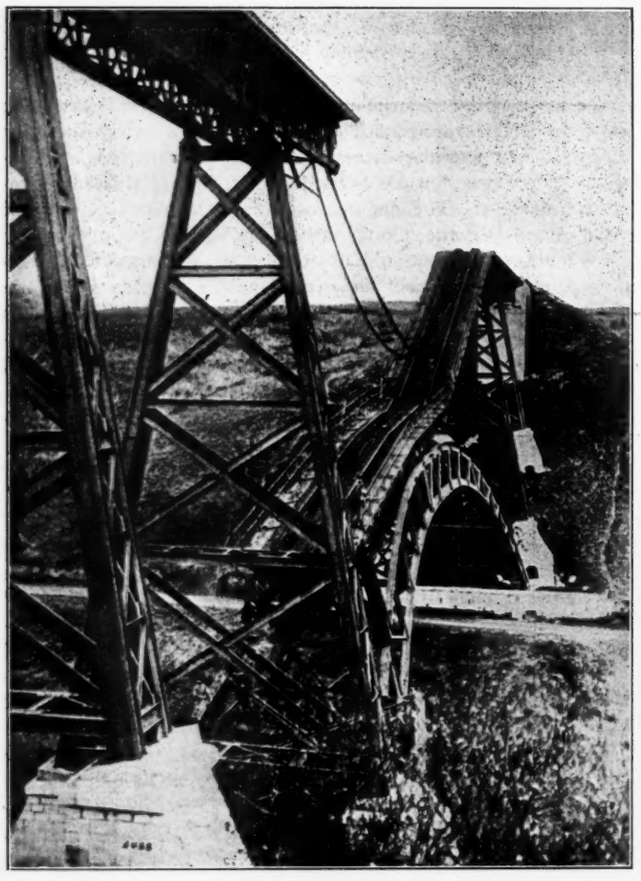
We keep a permanent record at the yard office of all cars handled, the cost of handling, and the yard damages; comparative statements are made each month with the preceding month and the same month of the previous year, showing all decreases and increases in cost of operation, yard damages, personal injuries and yard and terminal overtime. Any item showing an increase calls for a complete analysis and explanation. All the force takes a lively interest in reducing the cost of operation and yard damages and in decreasing the number of personal injuries. We have a safety committee which makes a periodical trip of inspection over the yards and reports all unsafe conditions and practices which are given immediate attention and either remedied or eliminated.

The yard is patrolled day and night by special watchmen who hold commissions as city or county officers, and all unauthorized persons are kept out of the yards as far as possible. Merchandise trains are guarded by these watchmen all of the time they remain in the yards.

DISINFECTING RAILWAY CARS IN RUSSIA.—In the year 1910, experiments were made in Russia in the disinfection of railway cars by steam and formalin, the latter being sprayed from a mechanical sprayer worked by naphtha. The results as regards destruction of germs—plague, typhoid, tuberculosis, etc.—and insects have recently been reviewed. They have been fairly satisfactory. At the commencement of the operation the temperature of the inside of the car—which is completely closed—is raised by the admission of steam to 65 deg. C. This occupies from 15 to 20 minutes, according to the design and size of the car. But it has not proved an easy matter to get a uniform temperature. The spray is then applied for 20 minutes. In practice the entire process occupies on an average about 45 minutes. Stress is laid upon the necessity for maintaining the internal temperature at or near 65 deg. C. Lately ammonia has been used with formalin. The vapors affect some of the paints used in the carriages, and that least injured appears to be the white lead paint used in the interior of the fourth-class cars.

RAILWAY AFFAIRS IN OTHER COUNTRIES

H. A. Walker, general manager of the London & Southwestern, in a speech at a dinner in London last week said that when the government took control of the English railways a period of 60 hours was allowed the railways in which to transport troops in 350 special trains to given points. The whole job was accomplished in 48 hours. Mr. Walker said that his own road had handled at the docks at Southampton 75 special troop trains in one day. These trains came from every part of the Kingdom, and were scheduled to arrive at 12-minute intervals. Every train kept to its schedule to the minute, yet in that 12-minute interval each preceding train unloaded troops, horses, etc., and got out of the way of the succeeding train. Mr. Walker paid a warm tribute to Henry W. Thornton, the American general manager of the Great Eastern, saying he had been received by his colleagues in that spirit of friendliness which dominated English and American railway men. Mr. Thornton



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Railway Bridge in Poland Destroyed by Austrians to Check the Russian Advance

made a speech, praising the efficient organization and spirit of patriotic co-operation manifested when the railways of England were suddenly called on to handle one of the biggest transportation problems in the world.

* * *

The first electrification of a steam railway within the Polar zone has been practically completed by the Swedish government on the Kiruna-Riksgraensen section of the line from Lulea, Sweden, on the Gulf of Bosnia, across the Scandinavian Peninsula to Narvik, Norway, on the Atlantic Ocean, a distance of 293 miles. Electrification was determined upon for the section from Kiruna, which is about 87 miles north of the Arctic Circle to Riksgraensen on the border line between Sweden and Norway, a distance of 80 miles, for the purpose of increasing the capacity of the line in preference to double tracking. Practically the only freight business is the transportation of iron ore, of which 3,000,000 tons were hauled in 1913 by steam. It was desired to increase the capacity to 5,000,000 tons a year, and electricity was adopted to permit heavier trains and an average increase of about 25 per cent in speed. The large amount of available water power and the scarcity of coal were also important factors. The electrified line runs through an uninhabited country where temperatures of from 25 to 35 deg. below zero are common in January and February. Although a period of two years was allowed in the contract for completing the work, the actual time available on account of weather conditions was only about seven months. The power station is located at Porjus Falls, 74 miles south of Kiruna, and power is transmitted at 80,000 volts by a tower transmission line to four substations, where the potential is stepped down to 15,000 volts for the contact trolley line. Electric locomotives hauling passenger trains of 200 metric tons and ore trains at 1,855 tons will be used, and the contract specifies speeds of 31 miles an hour on level track and 18.6 miles an hour on 1 per cent grades. The equipment will include two passenger and 13 freight locomotives.

SAFETY BAGGAGE RACK

The Atchison, Topeka & Santa Fe has placed in service on some of its through passenger train cars a new type of baggage rack designed by the engineer of car construction. These racks were designed to provide ample storage capacity. They are provided with gates which slide on the frame of the rack and serve to keep the bags, parcels, wraps, or whatever may be placed in the rack, in place. The illustration shows the racks installed in one of the day coaches recently built by the Santa Fe, and also shows the way in which the gates are operated by the passengers. There are two gates to each rack, so arranged that each may be operated independently of the other.

Safety Baggage Rack in Santa Fe Coaches

The racks are of special advantage, especially on through trains where a considerable amount of hand baggage is often carried by the passengers, in that they will hold more than the ordinary rack now used, and at the same time prevent the luggage from falling on the heads of the passengers. In this way it eliminates damage claims from these causes and provides sufficient capacity to hold all the baggage of the passengers, thus keeping the aisles free from obstruction. The construction is so substantial that the gates will slide easily when the rack is loaded to its full capacity.

The National Association of Railway Commissioners

Convention at Washington, D. C. Abstract of Committee Reports and Addresses. Valuation Discussed and Criticized

The twenty-sixth annual convention of the National Association of Railway Commissioners was held at Washington, D. C., on November 17 to 20. Delegates were present from 27 states and from Canada. Judson C. Clement, of the Interstate Commerce Commission, presented an address of welcome in which he urged the necessity for co-operation between state and federal authorities for the purpose of bringing about a uniformity of regulation, pointing out that unless there be uniformity in state policy the discrimination against which regulatory legislation is aimed will be perpetuated. He said that a state which declares a policy of low passenger fares places a burden on interstate commerce which must be borne by states which allow higher fares, and that the same is true with regard to low scales of freight rates.

Lawrence B. Finn, of Kentucky, president of the association, in his annual address, also discussed the conflict between state and federal legislation, saying that if the Interstate Commerce Commission ignores state-made rates, as it has announced its intention of doing in a number of cases, discriminations will continue. He referred to the conflict created by the differences between the policies of the federal commission and the state commissions as "competition in regulation," calculated to perpetuate discrimination. "Suppose a state commission has fixed intrastate rates," he said, "and the courts have refused to hold them to be unreasonable; subsequently these rates are investigated by the Interstate Commerce Commission, and are found to discriminate against interstate commerce. On an appeal to the courts the state rates are found not to be confiscatory; on an appeal to the federal Supreme Court, the finding of the Interstate Commerce Commission that they are discriminatory is sustained, which judgment shall prevail? If the former judgment prevails the discrimination continues. If the judgment concerning the act of the Interstate Commerce Commission prevails, then the state is deprived of rates which the courts refused on the first appeal to condemn."

Charles A. Prouty, director of valuation of the Interstate Commerce Commission, presented a discussion of the work of the commission in its valuation of the property of the railroads. Mr. Prouty said that probably the most important practical question before this country today is its treatment of the railroads, and that he has felt that this valuation must have a profound influence upon its discussion. The question as to whether the government is to take over these agencies of transportation or whether they shall be left to the operation of private capital can never be satisfactorily answered in the minds of most people until we know what relation the actual value bears to the present outstanding securities. Assuming that we are to leave the discharge of this function to private enterprise, there arises the even more difficult question as to what the treatment of this private capital shall be, and what rates shall be accorded in order that the present investment may be fairly dealt with. In the past this question has not been acute, for rates have been sufficient to maintain railroad credit, but it is evident that the time is at hand, if it is not already here, when there is grave doubt as to whether these rates must not be generally increased. This question cannot be satisfactorily answered until there is a national valuation of these properties. He said the commission has not yet determined the relation between present value and reproductive value, nor has it determined what value is to prevail in the final valuation of the property itself. Great doubt, he said, exists as to what ought to be attempted as to original cost to date. An attempt has been made to go back to the beginning and to rewrite the accounts for the carrier down to the present time, but that the work was so voluminous and expensive, as well as difficult, that a simpler plan had to be evolved. He estimated the cost of making the valuation at from $25,000,000 to $35,000,000 for the railroads, and about $12,500,000 for the government, if no attempt is made to find the original cost to date in too minute detail.

The discussion of the conflict between state and federal authorities also came up in connection with the report of the committee on amendment of the act to regulate commerce.

The Committee on Car Service, Demurrage, Reciprocal Demurrage and Storage Rules advocated reciprocal demurrage, and recommended that there be a meeting between the committee of the association and the National Industrial Traffic League demurrage committee, and the Committee on Relations Between Railroads of the American Railway Association to consider the subject.

The Committee on Express Rates and Express Charges, of which Martin S. Decker, of New York, is chairman, presented a report showing that the gross operating revenues of the express companies had been reduced from $168,800,000 for the fiscal year ending June 30, 1913, to $158,000,000 for the year ending June 30, 1914, while the operating income was reduced from $4,413,459 to $404,529. The report made no attempt to analyze the figures.

The Committtee on Rails and Equipment, of which C. C. McChord of the Interstate Commerce Commission is chairman, presented a report saying that rail statistics should be gathered and made available, which will show the causes of failure.

The Committee on Statistics and Accounts, of which B. H. Meyer of the Interstate Commerce Commission is chairman, recommended that the state commissions adopt completely the various accounting orders of the Interstate Commerce Commission on the ground that such adoption will secure a uniformity in accounting not otherwise practicable, and will permit the accumulation of a body of statistics which will become increasingly valuable as the period of years covered becomes greater. The committee also recommended that the committee for the ensuing year be instructed to revise the state forms for annual reports of steam railway companies to conform as closely as practicable to the revised form of annual reports adopted by the Interstate Commerce Commission.

The Committee on Railroad Taxes and Plans for Ascertaining the Fair Valuation of Railroad Property, of which John M. Eshleman, of California, is chairman, submitted a report outlining in detail the work done thus far by the Interstate Commerce Commission in its valuation of the property of the railroads. The committee made no recommendations, but suggested that those who framed the statute under which the commission acts were not as well informed on the problems to be met as might have been desirable, and suggested the necessity of a study of the statute both by representatives of the states and of the Interstate Commerce Commission, with a view to recommendations to Congress in the way of suggested amendments as the work proceeds. The committee expressed the belief that the work mapped out in the statute is impossible to be accomplished in its entirety, but that the commission will develop the difficulties of the plans. The committee also expressed the belief that the value of the work will not meet with the expectations of those who framed the statutes under which the work was undertaken.

The Committee on Uniform Classification and Simplification of Tariffs, of which E. E. Clark of the Interstate Commerce Commission is chairman, submitted a progress report, and recommended the adoption of a resolution which had been adopted in the previous two years, providing that there should be appropriate legislation by Congress authorizing and directing the Interstate Commerce Commission, assisted by a body of disinterested experts appointed by the commission and paid by the fed-

eral government, to frame and promulgate a classification of rates to apply uniformly over the United States.

The committee on Railway Service and Railway Accommodations, of which O. H. Hughes of Ohio is chairman, urged greater attention on the part of commissions to station accommodations. The committee said that "it is reasonable to say that more deaths are occasioned by improper ventilation of train coaches and waiting rooms than by train accidents." The report also considered a large number of the various details of railway service in which it found material for criticism, and recommended that the Interstate Commerce Commission be given full power and authority to prescribe the character of equipment to be used in interstate commerce, also authority to prescribe the manner of using or hauling the same.

The Committee on Rates and Rate-making submitted a report in which it said that while rates continue to be made by carriers and to be passed upon by regulatory commissions by the exercise of individual judgment, rather than by the application of any accepted formula or standard, there are two very noticeable present tendencies in the theory and practice of making and regulating rates. These are to give greater weight to cost in rate-making and to recognize the close relationship between railroad securities and railroad rates. One member of the committee is of the opinion that cost of service can be and ought to be made the basis of transportation charges.

The executive committee of the General Committee on Physical Valuation, of which Milo R. Maltbie of New York is chairman, submitted a report reviewing at length the work done by the Interstate Commerce Commission in connection with its valuation of the property of the railroads of the United States, and describing what has been done by the committee in an advisory capacity. The report states that generally the committee has taken the position that the department of valuation should report to the Interstate Commerce Commission the vital and fundamental facts necessary to a complete appraisal, but should not attempt to settle the questions of public policy, finance and law that are involved. These must be settled by the Interstate Commerce Commission, and if the department of valuation were to prejudge them, and if the department were not in accord with the commission, much of the work done by the department might be useless or subject to expensive revision. The report reviews a large number of questions in connection with the valuation which the committee has considered and on which it has expressed its views before the department of valuation. At the last conference the committee took the position that the railroad companies should state or the accountants of the department should ascertain to what extent existing property has been paid for, (1) by the issuance of securities or other obligations, (2) out of surplus income or, (3) out of operating expenses. This suggestion brought forth a statement from the railroad companies that if a company owned property used for railroad purposes it was entitled to have that property valued, and that it did not matter whether or not its cost had been included in operating expenses. To this the committee replied that the discussion of this subject involved questions of public policy and of constitutional law, and that the Interstate Commerce Commission should have before it a statement showing the sources of the funds used to pay for the property.

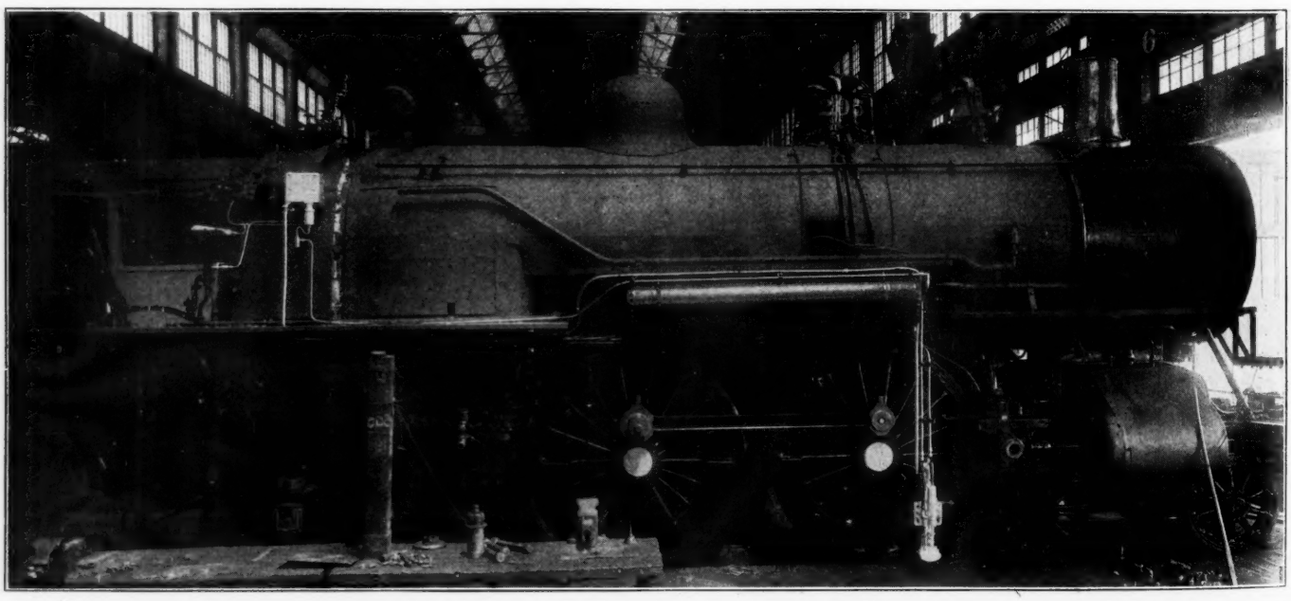
Arthur Hale, general agent of the American Railway Association, presented a paper on "The Danger of Freight Congestion."

Officers were elected for the ensuing year as follows: President, Clifford Thorne, of Iowa; first vice-president, R. B. Prentis, of Virginia; second vice-president, Max Thelen, of California. William H. Connolly, now secretary, was elected secretary for life, and James B. Walker, of New York, was made assistant secretary. It was decided to hold the next convention in San Francisco on October 12, 1915.

AUTOMATIC TRAIN STOPS ON THE CHICAGO & EASTERN ILLINOIS

The Miller automatic train stop apparatus, which has been in use on the Chicago & Eastern Illinois for a year past, constitutes the most extensive installation of the kind in America. The officers of the road have given us some account of their experiences with it; and for the first time we have some notes on the behavior of apparatus of this kind in a situation where both long and short trains are run and where both low and high speeds, with both passenger and freight trains are common in everyday service.

This device has been developed by the Miller Train Control Corporation, of Staunton, Va., a new concern in this field; and the installation on the Chicago & Eastern Illinois tracks has been made by it, at its own expense. A brief description of the system was published in the *Railway Age Gazette*, June 5, 1914, page 1246. Ninety locomotives have been equipped with the apparatus and the length of the road embraced in the in-



Automatic Stop Apparatus on Chicago & Eastern Illinois Locomotive

Cab Removed; Special Apparatus Painted White.

stallation is 107 miles, all double track, on the Chicago division. On 24 miles the stops have been in use for a year. The apparatus is electro-mechanical, so called. A ramp fixed on the ties, 22 in. outside of the track rail, engages a member depending from the engine. The ramps are fixed in the rear of each automatic block signal a sufficient distance to allow room in which to stop fast trains. The ramp, when not electrified, causes an application of the air-brakes; when electrified it energizes an electro-magnet on the engine which prevents the operation of the brake-applying apparatus. There is no visual or audible signal, and no speed recorder; neither is the operation of the apparatus affected in any way by the speed of the train; though these additional features have been worked out, so that they could be readily applied.

Each ramp is 180 ft. long with a short insulated section in the middle, making virtually two contact pieces. The outgoing end of the ramp is kept constantly electrified, so that an engine moving backward, as in switching operations, would never be stopped. The ramps are made of 35 lb. standard T-iron.

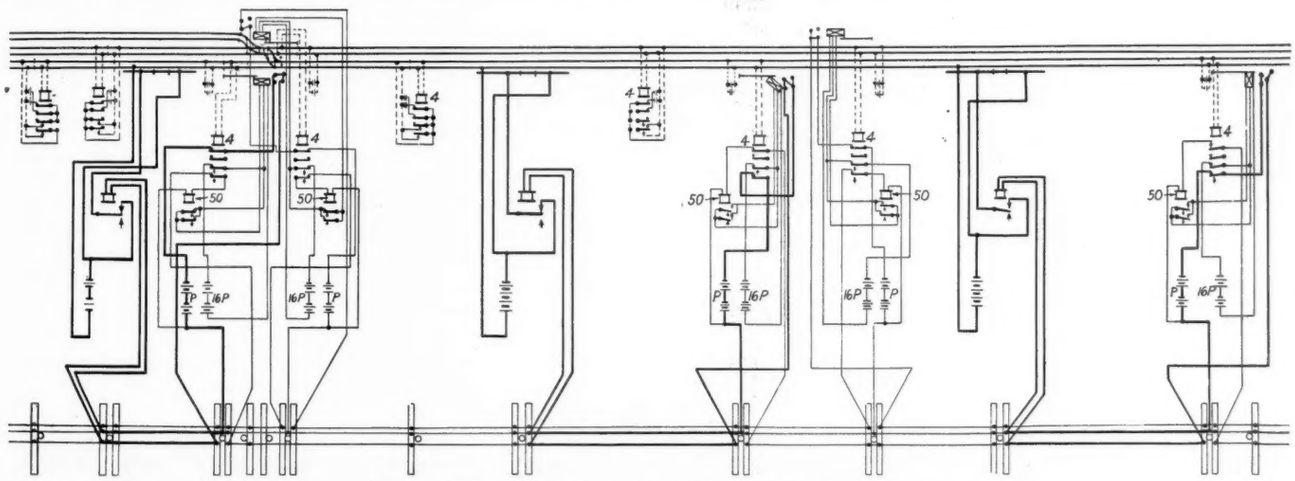
The contact member on the locomotive consists of a shoe fastened to the bottom of a vertically movable piston working against a strong spring, the whole being supported on the back end of the crosshead guides. The piston is raised three inches when it engages the ramp, the ramp being three inches higher in the center than at the point near the end where the shoe strikes it. The movement of the piston opens a valve, allowing air pressure from the air-brake train line to enter a small air cylinder in the cab of the locomotive. This pressure forces a piston upward; and this piston operates a crank controlled by an electric lock. The lock, mounted on an axle, revolves if its magnet is de-energized, but does not revolve if the magnet is energized. Revolving, an arm attached to it operates a three-ported valve, allowing air pressure from the train line to enter the operating cylinder. This opens the engineman's air-brake valve, giving a service application of the brakes; and closes the throttle. The electric lock is operated by a current from the road-side battery conveyed through a wire extending from the shoe upward through a pipe to the box in the locomotive cab which contains the lock.

Thus the absence of the electric current at a ramp, from any cause, will result in the application of the air-brakes. There is train line pressure in all pipes and a failure of pipes or their connections also causes a stop.

In the drawing, ramps are shown on the lower or eastbound track only. The wires which are added to the signal system for the operation of the stop are shown in heavy lines. The three eastbound signals shown in this drawing, it will be seen, are successively in the clear, caution and stop positions. At the signal which is at stop the circuit-breaker is open, de-energizing the relay which opens the circuit connecting with the ramp in the rear of this signal. At the other two signals the circuit-breakers connected with the signals are closed and the corresponding ramp relays hold the local circuits closed.

Immediately after the first installation was put in service, two enginemen were employed by the manufacturers as traveling inspectors, with orders to make surprise tests. In this way, check has been kept on the operating conditions developed; enginemen never knew when or where one of the traveling inspectors would board the train. The inspectors were required to report on daily forms the exact conditions met, on each train, when passing each ramp and each signal. During the entire time nothing has ever been encountered showing a false clear condition. In every case where there was a signal failure or an unnecessary stop, a careful analysis has been made to determine the exact cause. The inspectors report on each trip to the division engineer, and after investigations of any stops requiring explanation, a report is made to the superintendent, and a copy sent to the engineer of the train control company; the development of the system has very closely followed the information given in these reports. Some minor details have been changed to meet operating conditions more efficiently. There have been unnecessary or "safe" stops, but the number of these has been gradually reduced by investigating the causes and removing them.

The signal maintainers are required to report the ramp voltage on each ramp-stop report, and to test and report the ramp voltage weekly to see if there is any depreciation. The train speed has been required on ramp-stop reports, this to furnish data by which to determine whether the ramps are placed the right distances from the signals. These distances were estimated on a basis of a speed of 60 miles an hour. The reports also require information regarding the condition of the rail, whether there is sleet, rain or snow, and whether it is foggy or clear, and the direction and estimated velocity of the wind.



Automatic Block Signals on the Chicago & Eastern Illinois

Wires for train control apparatus are shown by heavy lines

As all of the ramps are fixed at or beyond the estimated necessary braking distance in the rear of the automatic block signals, and as, therefore, the engineman has no warning as to what to expect at any given ramp (except as he can see far ahead, or may be able to guess the conditions of the block which he is about to enter) the apparatus has come into use many times. In other words the system has been used not merely as an adjunct or a warning, or as a provision against emergencies, but has been worked regularly, along with the stop signals. There is no provision for warning the enginemen, to enable them to avoid being stopped by the operation of the shoe at any given ramp. In a given month for example, there were 122 cases of trains being stopped by the ramps. Of these, 107 are to be classed as normal; that is to say, the engineman found the visual signal against him.

Fifteen stops were caused by defects of apparatus, the block in advance being clear. These causes are classified as follows: two because of a broken wire on the engine magnet; one by a broken wire at the shoe; one because of wires crossed; six by the burning out of relays at the ramp; one by failure ol battery; four by defective relays at the ramp.

To test the practicability of applying air-brakes safely on long trains by means of an automatic apparatus, the Chicago & Eastern Illinois has made a number of experiments; and as a result of these experiments all of the locomotives used on long and heavy freight trains have been fitted with a control device which applies the air-brakes but does not close the throttle. With the lighter locomotives used on passenger and fast freight trains, the brakes are first applied and then the throttle is shut off after the reduction in pressure has had time to reach the rear end of the train. With the long and heavy freight trains, however, it was found that the automatic apparatus closed the throttle too soon. The throttle is now in complete control of the engineman. On passenger trains and light freights, the stops made by the apparatus are regarded as satisfactory.

In order to get a good idea of the performance of the train stops in bad weather, orders were given to the maintainers not to touch the ramps or to clear snow and ice from them during last winter, nor to adjust them during the summer when track was surfaced. A recent inspection of the ramps showed that none of them had been displaced a half-inch out of line in the entire length. No damage had been done to any of the ramps by parts dragging from cars. The ramp is fixed close to the running rail and the ends of it are bent downward and safely buried under the ties.

None of the ramps shows an appreciable effect of the wear of the shoes during service of more than a year. The wear on the shoes, which are made of hard metal, has resulted in a change in the device so that new wear blocks may be inserted in them by loosening two small bolts and exchanging the old wear block for a new one. There has been no mechanical maintenance charge for ramps to date, although a dragging freight car door came in contact with one of them.

It is estimated that the battery, of 16 cells, R. S. A. Standard, will last two years, the local circuit being closed only when a locomotive is passing over the ramp.

A good example of the successful operation of the apparatus under adverse conditions is given in the report of Inspector Wamba of the trip of passenger train No. 4 on February 23, 1914, when there were snow drifts six and eight feet deep in the cuts and the temperature was about zero. The storm had begun on the morning of the day before and continued all night, snow falling continuously and drifting badly, with a strong northeast wind. The windows of the cab of the locomotive were covered with snow on the outside and with a good deal of ice on the inside, caused by the melting and subsequent freezing of snow which was drawn into the cab by suction. The engineman's clothing was so badly frozen by the snow, which was blown in and covered everything in the cab, that he had to be relieved for a part of his trip by the inspector, who had been an engineer on the road. Most of the signals were not seen at all, and dependence was placed entirely on the automatic apparatus. All of the 16 signals shown on the report indicated "proceed" except one, No. 106, at which the train was stopped by the control apparatus. After the train had been stopped, the signal was seen to be red. The train made practically its running time, the engineman declaring that he felt safe because of his knowledge of the reliability of the train control apparatus. At the end of the trip the apparatus—shoe, wiring, piping and all details—was examined and found to be in perfect condition, although the shoe was a solid mass of ice and frozen snow.

Losses of Towels from English Railway Cars.—It was stated in a police-court prosecution at Newport, lately, that the Great Western had 30,000 towels stolen from its car lavatories last year.

EFFICIENT MARKETING OF FARM PRODUCE*

By D. G. Mellor

Manager, Order, Commission and Food Products Department, Wells, Fargo & Co.

Our food products department was organized in August, last year. We are a part of the traffic department, with a manager in New York City, assisted by seven industrial agents located in Baltimore, Cleveland, Chicago, St. Louis, Kansas City, Houston and San Francisco. The territory in which the company operates is definitely divided between them. Their duties are of a very general character, and cover anything that promises to be useful to producer, dealer or consumer. They familiarize themselves with the products now obtainable in their territory, their general quality and quantity; when they mature, how packed, and where marketed. We learn what produce that might be sold to good advantage is not grown in certain districts, and endeavor to interest someone in it. We secure data regarding the kind and size of packages required by law or practice in convenient markets, and advise where they may be bought. The names of dealers, hotels, restaurants, and other consumers living in towns along our lines are tabulated and given to producers who are interested in better markets, and the names of producers located on our lines are given to dealers and others who are anxious to secure more and better produce. This starts correspondence, and the movement of fruit, vegetables, butter, eggs, etc., from the farm, not only to the large cities, but to many small towns that under ordinary circumstances would not receive any of the melons, peaches, berries, etc., grown practically at their door. This results in a quick, cheap and very general distribution and minimizes the opportunity for glutted markets in which prices are often forced below the cost of transportation.

On July 1, Wells Fargo succeeded the United States Express on the Baltimore & Ohio. When this change had been decided on the Baltimore & Ohio officials called our attention to a large new crop of particularly fine peaches maturing almost immediately at several points on their line in West Virginia, in what may be termed the Cumberland district. I went there immediately and found the crop was all it had been reported to be. We suggested that we would undertake to circularize our agents at all fair-size towns on lines we operated east of Chicago and St. Louis, and tell them about the fine fruit, when it would begin to mature, and instruct them to call upon all dealers in their cities, and leave with each one a list of the growers which we had prepared and which was sent with our circular letter. This idea appealed to the leading orchardists, and the advice was sent out within a day or two. In the circular we also called for information regarding quantity and quality and maturing date of any locally grown fruit. This data opened up additional opportunities for business, and gave advance information that enabled us to avoid over-supplying certain districts and pointed out those offering the best market. We also asked for the names of dealers in each city, and how many baskets they thought they could sell daily. This data was compiled in convenient form and given to the growers. People at each end of the line began to write those at the other end. New opportunities for trade sprang up. Two thousand carloads of fruit moved to a very large number of markets and was sold at good prices, much better than would have been possible had they gone to only a few markets. No glut occurred anywhere.

To facilitate the movement of early fruits and vegetables from southern California, south Texas near the Mexican frontier, and other districts having a favorable climate, a fleet of up-to-date refrigerator cars have been built and are operated anywhere on the company's lines. They will soon begin to move early lettuce, peas, beans, etc., from the territory farthest south to St. Louis, Chicago, New York, Boston, Philadelphia, and other large northern cities where local consumption is considerable and from

*Abstract of paper presented before the Railway Development Association, Chicago, November 11, 1914.

which distribution to less important centers can conveniently be made. As the season advances the cars are loaded at more northerly producing points. By the closest possible supervision they are kept busy practically the whole year and offer sufficient refrigerator service to move all crops that mature and require refrigerator service by passenger train from points on our lines. The work of these cars is supplemented by a considerable number of pony refrigerators that are carried in ordinary express cars in care of our regular train messengers who attend to reicing whenever necessary. For the past month they have been moving regularly from southern California loaded with the first strawberries. Later they will carry the earliest cherries from the neighborhood of Sacramento. These little boxes, about as large as a good-sized trunk, moved from California last winter and spring to practically every northern state and to many important cities in Canada, Quebec and British Columbia. They made it possible for the grower to market his crop efficiently and are coming into more general use each season.

Our food products department is also doing a great deal of work on the direct-from-farm-to-table idea, something that appeals more directly to people generally than does the work I have just spoken of. When we find someone with good things to sell at fair prices, we tell interested consumers about it. Orders and cash are given to our agents who send both to the agent at the producing point. The orders are promptly filled and shipped. All concerned are benefited. So far the number of consumers who use this marketing medium has been steadily gaining.

Each Monday morning we receive quotations at New York and some other important cities, on various kinds of produce. These prices hold good for the whole week. This data is tabulated and a weekly bulletin is sent off each Monday to agents and to people who have asked for them. Against each kind of produce we show where it can be had and how it is packed. With this data it is an easy matter to see if there is an advantage and how much. In New York City and in the Jersey suburbs we have a large number of branch offices. To each of these we send one or more bulletins, for information and distribution. A large number of individuals outside our service are also supplied. Many orders for produce are given to our agents to fill. Eggs are another commodity that moves advantageously in small lots direct from producer to consumer. During the past year we have heard from a great number of shippers and have moved many hundreds of cases. Usually 15 or 30 dozen can be had for about five cents per dozen less than the retail city price. Many families cannot use a large quantity of either butter or eggs. For such people we have shippers who put up 10 lb. of butter and 10 doz. of eggs in one package, or any other quantity that will suit better, but less will not be economical.

Farmers are putting up bushel boxes of either apples or potatoes, also boxes containing a half bushel of each. At 10 cents per quart a bushel would cost $3.20. Good potatoes are delivered in New York for 90 cents per bushel and apples from $1 to $1.50. Honey is another product with which our success has been marked. Thirty tons were shipped last season in small lots from one station in Michigan. We are advised that this successful movement has resulted in the production of 40 tons this year and that orders are coming in fast. Ham and bacon, maple sugar and syrup, country sausage, fancy cheese, buckwheat flour, and dressed poultry, either by itself or in combination boxes with eggs and butter, are popular. Chestnuts and pecans are also seasonable products that take well. Last year between Thanksgiving and New Year's we took many orders for a combination box consisting of a turkey, celery, cranberries, and sweet potatoes. This year there is a great demand for the same package.

For the purpose of developing trade in California specialties we made a rate last year of four cents per pound, with a minimum of 35 cents per package, to apply on all kinds of food products from the Pacific Coast to any point reached by Wells Fargo, the American, Adams, or United States Express. In other words, the rate applied entirely across the continent to the farthermost point in Maine. A little booklet of 20 pages, mentioning many of the products for which California is famous, was printed and distributed from our important offices east of the Missouri River. In this booklet we explained that raisins, prunes, figs, olives, nuts, oranges, and all kinds of dried and preserved fruits and vegetables would be delivered at the door for a certain price. A gallon of ripe olives cost only $1.28. Eight pounds of freshly packed prunes were delivered for $1.13. Orders were received by hundreds. Between November 1 and May 1 80,000 packages of these delicious products moved directly from producer to consumer. Many housewives learned for the first time that these home grown fruits were the best in the world. This year's booklet came out last week; already orders are coming in. Judging from results during the few days since distribution and by the numerous calls we had for the booklet before it was issued, we expect that the volume of business this year will be even greater than last.

In this direct marketing idea one difficulty developed early. That was, the inability of small families to buy much at one time of many things in almost daily use. Our buying clubs are the result of this condition. In offices, stores, factories, police and fire stations, also in post offices, men have seen the advantage to be secured through collective buying. Ten men decide that between them they can use 30 dozen eggs or 20 pounds of butter. One of them acts for the club, collects the cost of the eggs and butter from his fellows, and takes it with the order to our nearest agent. He issues a money order and sends both to the producer. The eggs and butter are promptly shipped. On arrival a division is made and each man carries his share home. All are actually doing something themselves to reduce their cost of living. They can usually save about five cents per dozen on eggs and five cents per pound on butter.

TESTS FOR COLOR BLINDNESS IN NEW SOUTH WALES

Dr. G. H. Taylor, chief medical officer of the government railways of New South Wales, reports that in examinations of men for defective vision, he is making use, with very satisfactory results, of Stilling's plates and Nagel's anomaloscope. The regular examinations on the New South Wales roads are by Holmgren's wools and Williams' lantern, but in any case which is doubtful resort may be had to these other schemes.

Stilling's plates are a series of plates arranged two on a page in book form, each plate about 4 by 3½ in. They were designed by Professor Stilling, of Strassburg. On each plate there are numbers, some 2½ in. in height, made up of a series of reddish dots, of different shades; and, forming a background for these reddish figures, is a groundwork of dots of different sizes and shades, and of such colors as the color blind are likely to confuse with colors in the figures. When a person with normal vision is shown these charts he has no difficulty in reading the numbers, but one with defective color sense, especially for red and green, finds it difficult or impossible to distinguish the color of the figures from that of the background; and so he cannot read the figures.

The anomaloscope is made by Dr. Nagel, of Berlin. One of them was shown by Dr. Williams at the meeting of the Ophthalmological Section of the American Medical Association at Atlantic City last June. It is very useful in testing doubtful cases, but is not available for use in the routine examination of large numbers of men on account of the care necessary in its manipulation and the difficulty of transporting it safely. It uses pure prismatic colors, and is so arranged that as one looks into the eyepiece he sees a circular field, the lower half of which is lighted by a pure sodium yellow, which can be varied in intensity, while the upper half is lighted by a mixture of pure red and green. These colors, in certain proportions, make a yellow which corresponds to the yellow in the lower half of the field, if it is of a certain brightness.

The tests are made (*a*) by seeing what mixture of red and green the person under examination will make to match the

sodium yellow, and then (*b*) by seeing what brightness of the yellow he will make to match the red-green mixture, the mixture being varied to show a marked red, or a marked green. The normal eye cannot make a match under these last two conditions, but the person with defective vision is satisfied with a match made of the two halves of the field by altering the intensity of the yellow.

Dr. Taylor says that in the year 1913 the number of candidates for employment on the New South Wales lines who were rejected because of defective color sense was 800 out of a total of 13,803 applicants, or 5.8 per cent; and for the past six years the average percentage rejected was 5.5. Furthermore, in a study of 200 consecutive examinations this last year he found 15 rejections, or 7.5 per cent. Of these 15, seven, or nearly one-half, passed Holmgren's wool test successfully, but all failed when tested by Williams' lantern.

In the early years of the investigation of color blindness—a physical defect which, broadly speaking, is congenital and incurable—it was everywhere accepted as a fact that among men (not including women) the universal percentage of color-blinds was four; in any large number of men, one in twenty-five would always be found defective. Whether these higher percentages reported from Australia are the result of more searching tests or are due to some difference in Australian subjects, as compared with men examined in Europe and America, does not appear.

In all of the 200 examinations just referred to, Stilling's plates were used; and, in addition, 52 consecutive cases were tested with the anomaloscope. Writing concerning these cases, Dr. Taylor says:

"The method of examination in this railway service is by regulation confined to the modified Williams' lantern and Holmgren's wools. Men in the service and employed on the running lines are periodically examined by the lantern only.

"My method of examining by Stilling's plates is to take candidates in batches of four, after the examination by the wools and lantern. A large majority of partial failures was in mistaking the 3 for an 8, or the 7 for a 2. In a second attempt they named the numbers correctly. A failure was recorded when a man did not correct his mistake, although he may have named one of the two numbers correctly. Red-green-blinds by the lantern are in my experience always convicted of color blindness by Stilling's plates. A candidate who can name all of the plates without hesitation is rare, although I have seen an uneducated laborer do so. I have examined a very large number of candidates by Stilling's plates. In my opinion it is an admirable method of testing color sense, and is of more assistance to the examiner and much more reliable than is Holmgren's wool test. It is indeed the best single test I have seen. But it would be unwise to trust entirely to Stilling's plates, as occasionally a feeble color sense is not detected by that method, and a defect by Stilling's method may not be so clearly defined to an ordinary observer as by the lantern. The education of a defective color sense by Stilling's test depreciates the value of the test, as it does with the wools, the lantern and the anomaloscope, but there is a limit in each person beyond which the education of a defective sense cannot go.

"Complete blindness in the numbers of any of Stilling's first five groups should, in my opinion, be enough to reject a candidate, although he is able to pass the lantern test without mistake.

"Stilling's method is of great assistance in determining the fate of green-white men. A green-white man by the lantern, in my opinion, if he fail completely in any plate of Stilling's first nine groups should be rejected without the right of appeal. If he fail in the lantern test, but does not fail in Stilling, he should be allowed a re-test. If he fail only in Stilling he should be allowed a re-test. Every color tester of wide experience must have seen, as a rare case, a green-white man convict himself in a second examination of red-green-blindness by the lantern.

"When large numbers of men are examined, it would be necessary that each pair of numbers in Stilling's plates should be separated from the book and pasted on a flat surface and used as a card.

"With the anomaloscope, persons with a normal color sense and trained in color will be found to vary on different days. Some persons are more consistent in their appraisement than others.

"Has the tobacco or alcohol habit an equal effect upon the appraisement of color in persons with a keen and in persons with a feeble sense of color? Is a temporary disorder of body or mind, which may slightly disturb the judgment of an ordinary man, more liable to cause error in color discernment in a person with a feeble sense than in a person with a keen color sense? Is it safe to allow a person who has at any time been convicted of having a feeble color sense to act as a driver or fireman on the running lines? These are interesting questions concerning which science has not yet spoken definitely. But the examiner can take no risk."

Dr. Taylor sums up his experience with Stilling's plates by the statement that in his opinion these plates should replace Holmgren wools, as a test for color vision in the railway service, and be used in conjunction with the Williams lantern, as modified by him.

STRIKE ON THE ST. LOUIS SOUTHWESTERN

As noted in a recent issue the circuit court of the city of St. Louis (Mo.) has issued an injunction restraining the firemen, trainmen and conductors' brotherhoods on the St. Louis Southwestern from striking on account of the discharge of a conductor for intoxication. The following extracts from the court's opinion reveal some of the methods adopted by the brotherhood to prevent the exercise of discipline by the management, and their manner of taking a strike vote. The decision relates the history of the case, showing that after Conductor Tillman had been discharged for intoxication he filed a grievance with the committee of the Order of Railway Conductors, which in due course reached the defendants in the case, the chief officials of the federated organizations on the railway. A complete investigation was held in the president's office, and a large amount of testimony was taken on both sides. That testimony was printed and distributed in booklet form by the railway company on September 4, but on September 2 the officers of the organizations ordered a strike ballot of the engineers, conductors, firemen and trainmen, and although they were informed by President Britton that he would have the testimony printed in full and furnished to all the members of the order, they declined to wait for the testimony. The result of the vote by the engineers was against a strike. The other three orders voted for a strike, the conductors by a very small majority.

The court says:

"The method of taking the vote was to send a messenger to call upon the members of the order, and after they had voted to deliver the vote to the messenger, to be returned to the defendants. In most cases they declined to let the members take the vote and brief home with them or to have any chance to examine them, except right there at the time.

"The strike ballot purports to convey to the members of the orders the facts which had come into the possession of these defendants with reference to the intoxication of the conductor at the time he was alleged to have been intoxicated.

"The ballot sent out was a printed document, purporting to present to the members at least a synopsis or resumé of the facts and testimony that the defendants had taken, and to be a fair presentation of the facts to the members, so that they could vote intelligently, and that undoubtedly is a necessary requirement, because the members themselves know nothing about the proceeding except what they may gather in a general way, and from this statement; and they undoubtedly relied very much upon what this strike ballot contained in deciding how they should vote.

"It was a matter of a good deal of importance with them whether a strike should be ordered or not, and the statement should contain a fair synopsis of the testimony and of all the facts.

"After the vote had been taken and reported, and before it was declared, the pamphlet of the 4th of September, which was published by the railway company, was sent out, containing all the testimony. There was an effort then made by the members of the orders, or quite a number of them, to have either a new vote taken, or to have the strike declared off. They held meetings at points on the road, and some of them telegraphed and some sent by letter requests to have their votes changed. The committee refused to accept those orders to change any of the votes. The testimony shows that they claimed that before they were received the votes had already been canvassed, counted and the result declared. I do not think that the testimony establishes that fact. Some of those telegrams at least came before that was done. I think that was not done until about the 15th or 16th of September. In passing it is well enough to say that there is no question but that a member should have a right to have his vote changed at any time before the vote is canvassed and the result finally declared. The method of doing that should only have required such means as would properly and certainly inform the committee that that particular member wanted his vote changed, whether by telegram, a letter or in person; provided the committee was assured of the verity of the demand.

"Finally, a large number of the members of these orders came to St. Louis, and there was a meeting held at which some of the defendants were present a part of the time, and the result was that the members who came here did not succeed in any way and they were informed by the chief officer who had the right to declare a strike that they had received the authority to do so, and he was going to do it whatever might happen. I think his language was that he would declare a strike if only one man went out and the orders went to perdition.

"Having failed to get any relief in that way, certain members filed this suit to enjoin the defendants from declaring a strike on the vote which had been taken. I think there were five members to begin with, all conductors. Afterwards a large number of the members sent their written requests to counsel representing the plaintiffs, to have their names entered as plaintiffs. Afterwards quite a number of those made affidavits stating that they wanted their names withdrawn as plaintiffs.

"A comparison of the matter set out in the strike vote or strike ballot and the printed testimony contained in the pamphlet of September 4 last and a careful consideration of all the testimony leave no doubt whatever in my mind that the matter set forth in the strike ballot does not present to the members such a statement as would enable them to intelligently pass upon the question of the intoxication of Mr. Tillman.

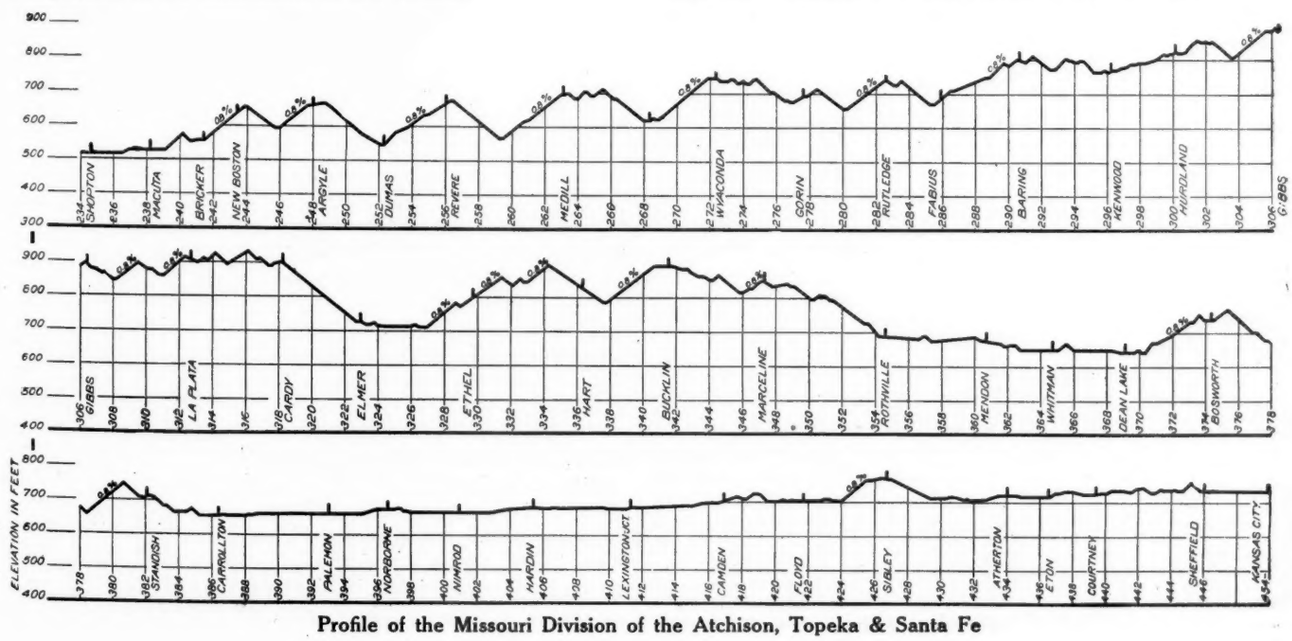
"The members in a case of this kind must necessarily depend to a large degree upon the officials who investigate it and they are entitled to a fair statement of the facts. If they attempt to give the facts which they ought to do, because these members who vote act somewhat in the capacity of a jury, as it were, they ought to give the facts on both sides so the men can vote intelligently and determine for themselves whether a strike should be ordered or not. It must be a two-thirds vote. The engineers, as I have stated, voted not to go out, and the conductors, I find from the testimony, so far as it bears on that, had a very small majority.

"The conclusion, therefore, is that that paper called the strike vote or ballot, does not contain that full and fair statement that it should, which necessarily results in a finding in favor of the plaintiffs. A temporary injunction will be granted on plaintiffs' giving a bond for $3,000.00. The injunction will not interfere with the defendants' taking another vote if they choose to do so."

PERFORMANCE OF SANTA FE BALANCED COMPOUND PACIFIC TYPE LOCOMOTIVE

In the early part of the present year the Atchison, Topeka & Santa Fe received 35 balanced compound Pacific type locomotives, some of which were put in service on the Missouri division. These locomotives, which were illustrated and described on page 1519 of the June 19, 1914, issue of the *Railway Age Gazette*, have a total weight of 277,700 lb., develop a tractive effort of 34,000 lb. and, owing to the continually increasing weight of passenger trains, are being used to replace balanced compound Atlantic type locomotives, on this division. As will be seen from the profile the Missouri division is very hilly with a ruling grade of .8 per cent; and from Shopton, Ia., to Carrollton, Mo., a distance of 152 miles, about two-thirds the length of the division, the curves are numerous with but little straight track. While none of the grades are long, many are too long to be considered as momentum grades.

On September 24 a test run was made with one of the Pacific type locomotives on train No. 7, between Shopton, Ia., and Big Blue Junction, at which point the Santa Fe joins the Kansas City Terminal. No. 7 is a fast express and mail train leaving Chicago at 2:15 a. m.; it is delivered to the Missouri division at Shopton, which point it is scheduled to leave at 8:16 a. m. The test train consisted of one dynamometer car, one test car, two mail cars, 10 baggage and express cars, three coaches, and one business car, making a total of



Profile of the Missouri Division of the Atchison, Topeka & Santa Fe

18 cars, weighing 1,085 tons. On the first district between Shopton and Marceline, a distance of 112.7 miles, the train is scheduled at an average speed of 40 miles an hour, including two regular station stops. Over the second district from Marceline to Big Blue Junction, a distance of 99 miles, the schedule speed is 37 miles an hour including three stops. The test train left Shopton at 8:21 a. m., five minutes late; arrived at Marceline at 11:07 a. m., two minutes late and left that point at 11:14, four minutes late. At Deans Lake, 21 miles west of Marceline the train was on time and remained so until after passing Carrollton. It left Lexington Junction at 12:45, seven minutes late, but made up this time before passing Eton and finished the run on time, arriving at Big Blue Junction at 1:42 p. m. Owing to a number of recent slides and slight washouts there were several slow orders, a total delayed time of 28 min. occurring between terminals. In ascending what is known as Ethel hill, a slow order was encountered which made it necessary to reduce the speed to 10 miles an hour on the hardest part of the grade, but the engine accelerated the train to a speed of 28 miles an hour before reaching the top of the hill two miles beyond. Including stops the train made an average speed over the division of 40 miles an hour; deducting stops the average speed was 43 miles an hour. The maximum speed attained was 65 miles an hour and with one exception the engine was able to keep the speed above 35 miles an hour on the most difficult ascending grades. In ascending New Boston hill the speed was reduced to 26 miles an hour on account of the brakes sticking on two cars. On the straight and practically level track of the second district the engine had no difficulty in maintaining a period of 47 miles an hour. During the trip the engine consumed 13.1 tons of coal and used 16,140 gal. of water.

ENGINEMEN'S EXPERIENCES—YOUTHFUL RECKLESSNESS*

By F. Henry

My first experience hauling a passenger train (or in fact any train) was when I had been firing for about three or four years. Promotions were slow in those days. I was called to go to a certain city some fifty miles distant, and pilot a B. of L. E. excursion train, consisting of twelve coaches and two baggage cars, to a lake resort situated on our line. The train had started from a point on another road, and none of the men being familiar with the road over which they were about to go, a pilot was necessary. When I reached the aforementioned city, the train was waiting for its pilot. As I stepped upon—or rather climbed upon the engine, it being a large class X engine with 80 inch drivers—the engineer said to me, "Are you an engineer or a conductor?" The first thought that entered my mind was, he wants to know whether I am one of the engine or train crew; sometimes a conductor was sent as a pilot, and sometimes an engineer; so I answered offhand, "engineer." "Here, take her; I am going back with the boys," was his answer. And before I could stop him, he had disappeared in the coaches in the rear.

Well, I realized that I was up against it, and it was up to me to get that train with its thousand and more souls safely to their destination.

We started; the roadbed was good, and I had right over all opposing trains; the engine rode nicely, and I gave her her head. The first stop was twenty-five miles from the starting point, and before I realized it, I was there; after coming to a stop, I looked at my watch; and I had made the twenty-five miles, from a stand-still, in nineteen minutes. I thought my watch must have stopped, and asked the fireman to give me the right time. He did so, and I found my watch was correct.

Not being familiar with the engine I was running, and not having taken into consideration the large size of the driving wheels, I had made, I think about the fastest time that had ever been made over that piece of track, and reached my destination without mishap. Needless, to say, there were many comments from the occupants of the coaches in regard to the nerve of the "engineer" who was pulling them.

Years passed, and working conditions not being to my liking, I crossed the Continent and took a position on another road.

There being a shortage of engineers, I was called to go out, the first night after my arrival, without having had a chance to learn the road or in any way familiarize myself with the engines in use, or learn their system of doing things. My trip started with sea level, and ended high up in the mountains; I arrived safely, for a wonder. Then having had about half the sleep I needed, I was called to take a train of 13 coaches, back to the place I had started from the night before.

It was a night of a winter month, dark and stormy; however, I reached my destination without mishap; but I have often wondered what would have been the thoughts of those 1,000 people who were depending on me for their safety, could they have known that the engineer pulling them half the time didn't know where he was.

General Sherman said "War is hell." Railroading is not hell, but oftentimes General Sherman's *bon mot* comes to mind. Think of the collisions and derailments now and then, reminding the engineer that any moment may be his last. Even when we shut our eyes to the dangers there are plenty of rough places. We get in from a run, eat and go to bed for a much needed rest; we perhaps have bought tickets for a theater, or if Sunday, start with our family for church; the call boy is after you; it doesn't matter where you are. he comes for you, and you have to go. Never a minute to call your own; never can count on going anywhere; or doing anything like other people. It is a wonder an engineer's nerves do not go all to pieces; but they don't. There are few railroad managements that recognize the importance of the engineer's position; the Pennsylvania is the only one I know of. On that road engineers are consulted when a new time table is being prepared. If on the road, and the superintendent wants to know what time you can get to such and such a point, so he can arrange a meet to advantage, he asks the engineer; not the conductor, as is done on most roads. If a good run is made, the engineer is congratulated; not the conductor.

*This is the third of a series of articles, made up of useful hints to locomotive runners, which were written in connection with the prize competition of several months ago. The first and second articles of this series were printed September 25 and October 2.—Editor.

AUTOMATIC MAIL EXCHANGE SYSTEM

With the contract awarded to the Hupp Automatic Mail Exchange Company, Chicago, by the Chicago & Alton for the installation of its mail exchange system on mail cars and 33 mail exchange stations between Chicago and St. Louis a new step has been taken in the transfer of mail from moving trains. The limit of mail exchanged under speed has been one bag per station, but with the Hupp system, as it is now developed, 12 bags may be caught at each station. The interesting feature of this system is that the discharging and receiving of the mail is done automatically. The mechanism performing the work is driven from a worm attached to the middle of one of the axles of the mail car. This worm engages with the worm wheel on the driving shaft of the mechanism, which is provided with a double knuckle and slip joint to allow for the oscillation and swerving of the body of the car. It is geared to operate cams 124 times slower than the car axle revolves.

The mechanism is thrown into gear by means of a trip located outside of the rail on the roadway, just 390 ft. from the exchange station. When the machinery is set in motion the car door begins to open and continues opening while the train covers a distance of 180 ft. The next step is the opening of the receiving arms, which are attached to the side of the car.

They open at the forward end in the manner of a gate, and become fully extended as the train travels another 180 ft. At the same time the delivery chute is automatically moved out of the door and by the time it reaches the station receiving trough, as shown in the illustration, the bottom of the delivery chute is at an angle of 45 deg., and the mail bags slide from the car by their own weight. The mechanism then brings the chute back inside of the car, closes in the receiving arms and closes the

Hupp Automatic Mail Exchange System Receiving Mail from Cranes

door. By the time the train has traversed the third 180 ft. these arms have been returned to their original position at the side of the car. It is necessary for the car, however, to travel several hundred feet more before the cam wheel completes its revolution and is automatically locked out of action. The receiving arms start to extend outward about 30 ft. before the delivery chute starts out of the car, but the delivery chute returns before the receiving arms are folded. It takes 1,080 ft. for the mecha-

Hupp Automatic Mail Exchange System Delivering Mail Into Receiving Trough

nism to perform a full cycle, but it is so arranged that the car passes only 780 ft. from the time the door begins to open until it is entirely closed.

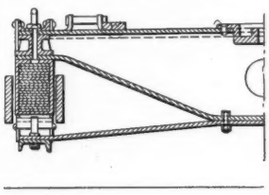
The pouches or sacks to be caught are placed in crane clamps of special design, which hold the sack at the top and bottom. When the pouch is taken from the crane the clamps swing automatically out of line with the travel of the train, thus tending to eliminate the wear and tear of the pouches. With this device it is not necessary for any of the mail clerks to go near the door while the train is running. They are warned the instant the mechanism is tripped by signal from a 6-in. gong. They are only required to place the sacks in position in the chute for delivery. In case it is not desired to discharge or receive any mail at the prescribed stations a lever is provided by which the mechanism can be thrown out of gear, and it also permits of reversing the gear so that the car may be used in either direction.

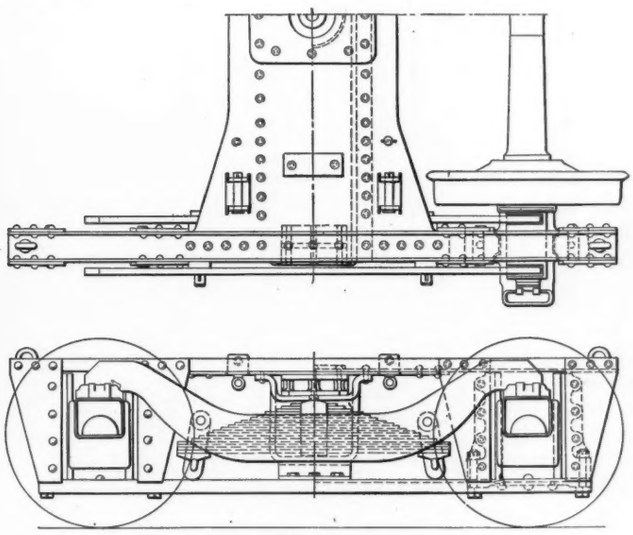
As will be noticed from the photograph, the delivery chute deposits the mail pouches in a trough along the side of the track, the drop being less than a foot. The mail bags slide along this trough until the force of their momentum is expended, which is done with practically no damage to the contents of the bag. This trough is about 150 ft. long. The advantages claimed for this system are that a greater amount of mail may be handled at the stations without stopping; that the apparatus is automatic and eliminates danger to the mail clerks when catching mail; that the mail will be more carefully deposited at the station, and that on many roads it will eliminate stops that are now necessary for the collection of mail. This apparatus will handle mail at a speed of 60 miles an hour.

STRUCTURAL STEEL TENDER TRUCK

A structural steel tender truck of the equalized pedestal type has recently been introduced by the Canadian Locomotive Company, Ltd., Kingston, Ont. The construction has been developed and patented by Messrs. Casey and Cavin, with the view to increasing strength and durability, and at the same time effecting a considerable reduction in weight.

Owing to the inherent tendency to internal strains and shrinkage cracks which exists in cast steel bolsters, much trouble has been experienced on many Canadian roads with the present type of equalized pedestal truck. In order to preserve an adequate factor of safety the bolster castings are necessarily much heavier than they would be if a more reliable material were used. The





Structural Steel Pedestal Tender Truck

new truck is built up, with two exceptions, entirely of rolled sections in which the strength of the material is uniform and definitely known. The bolster is of pressed steel, flanged with a

deep section at the center and decreasing in depth toward the ends. It has a large cover plate hydraulically riveted to the flanges at the top. The ends of this plate, which are secured to the side frames, are considerably wider than the bolster, thus forming a strong diagonal bracing for the whole truck structure. Apertures are provided in the cover plate for the center casting and brake hangers. The hangers are supported from lugs punched and bent from the cover plate and forming an integral part of it. Both the top and bottom rails of the side frames are of channel sections and are connected by plates which form the pedestals for the journal box. The ends of the bolster at the spring seat are stiffened by light cast steel fillers inserted between the bolster and cover plate.

Owing to the limited space between the spring and equalizers a drop forged T-head hanger has been substituted for the usual type of U-hanger used on this type of spring suspension. These hangers extend through slots in the ends of the springs and are held in position by gibs in the manner commonly used in driving spring suspension. The saving in weight effected by this construction is claimed to be about 1,500 lb. per truck, making a total of 3,000 lb. reduction in dead weight per tender.

COLE HOT BLAST STOVE

One field in fuel economy has been overlooked on many roads, and that is the heating of small stations, freight houses, signal towers, etc., which are heated by the common, ordinary stove. The Cole Manufacturing Company, Chicago, has a stove on the market for such service which is claimed to save one-third of the fuel that would be consumed in any lower draft stove of the same size with soft coal, slack or lignite. A report of the service that one of the stoves rendered in a station having an interlocking plant in the office in a small town in Central Illinois states that the fuel consumption for heating was reduced from 30 to 35 tons to 15 to 18 tons, or about 50 per cent. This multiplied by the number of stations and similar buildings where stoves are used would represent a saving in fuel that should not be overlooked and on some of the larger roads would amount to $75,000 or $100,000 per year.

Cole Hot Blast Stove Showing Interior Arrangement

The special feature of the Cole stove and that which it is claimed is responsible for its economy, is the top hot blast draft which admits the air to the top of the fire rather than through the grate, as is generally the custom. The illustration shows its construction clearly. It consists of a double shell and a boiler plate bottom of air tight construction. The fire pot and lining are of cast iron and are supported by legs, which simply rest on the bottom of the stove with no fastening whatever. The grate is cone shaped. The ashes are removed through the flap door shown at the base of the stove, the joints being ground in order to maintain an air tight fit. The fuel is admitted through a similar door at the top of the stove. The air is admitted through a damper opening at the top of the stove and conducted down to the top of the fuel bed by the pipe shown in the illustration. This furnishes the air where it is most needed and insures the complete combustion of the gases driven off from the coal.

The stove is easily maintained. A new fire pot may be dropped into place by removing the top of the stove, which is held in place by three bolts. The cost of maintenance, as shown by one of the northern roads which has had over 1,000 of these stoves in service for about 10 years, is about 39 cents per stove per year. It is also claimed that these stoves will hold a fire for 36 hours without attention with either soft or hard coal. Advantages are also claimed from a fire risk standpoint, a special anti-puffing draft being supplied to eliminate explosions that sometimes occur in such stoves; in addition there is no opportunity for live coals to fall from the stove, as the fuel door is at the top.

FEDERAL ACCIDENT COMPENSATION LAW

The total number of claims filed during the first five years of the Federal accident compensation law was 14,963, of which 14,046 were allowed, 911 disallowed, and 6 were still under consideration at the end of that period. Of the cases allowed 437 were for fatal accidents. The total compensation paid for all accidents during the five years amounted to over $1,800,000. Of this more than $732,000 was paid to 6,315 employees of the Isthmian Canal Commission.

In the fiscal year 1912-13 the average compensation reported for 3,320 non-fatal and 56 fatal cases was $107 and $661 respectively. Of the non-fatal cases 996 were Isthmian Canal Commission employees, who are largely unskilled and are exposed to great hazard. Of the fatal cases 11 were Isthmian Canal and 45 other employees, the compensation averaging $410.77 and $722.31 respectively. The failure to recognize properly permanent partial disability results in inadequate compensation in many cases. Thus in a case of the loss of a right arm the injured workman received less than $50, while in three cases of the loss of both legs, occurring during the third year, the average compensation was $377.

This accident law, passed on May 30, 1908, providing compensation for accidents to certain employees of the Federal government, has now been in force five years. It was the pioneer general accident compensation law in this country, but since its enactment 24 states have made provision for compensation in some form, all of them, however, on a more liberal basis. It is estimated that 95,000 persons are covered by the provisions of the law, somewhat less than one-fourth of the civilian employees of the federal government. The act is administered by the Secretary of Labor, except as it affects employees of the Isthmian Canal Commission. It allows compensation only for accidents sustained in the course of employment without negligence or misconduct, causing disability exceeding 15 days or resulting in death. Compensation is on the basis of full wages, but payment is limited to one year even in cases of death and total permanent disability.

General News Department

Citizens of Port Huron, Mich., have subscribed $100,000, which is to be offered to the Grand Trunk Railway to induce the road to rebuild the shops in that city recently destroyed by fire.

The American Concrete Institute will hold its eleventh annual convention, February 9-12, 1915, at Chicago, Ill. The work of the convention will cover concrete roads, sidewalks and bridges, concrete and reinforced concrete tests and design, concrete art and architecture, and plant management and costs.

The owners of the Atlantic Southern, extending from Atlantic to Villisca, Iowa, 35 miles, have given public notice of their intention to discontinue operation on December 31, claiming that the road has been operated at a loss. It is reported that the people in the towns along the line are preparing to enter a protest before the State Railroad Commission against the closing of the line.

Members of the Order of Railway Conductors employed on the St. Louis Southwestern are taking a second strike vote to determine whether they shall call a strike in the event a conductor discharged over a year ago for intoxication is not reinstated. A strike vote was taken some time ago, but the calling of a strike was enjoined by the state circuit court on the petition of a number of conductors who claimed that the strike ballot which was issued contained a one-sided statement of the controversy arising from the discharge of the conductor. The court, in enjoining the taking of a strike vote, said the officers could order a second vote if they desired. The conductors who took the matter to the court have been expelled from the Order of Railroad Conductors; and it is said that some enginemen have suffered for their independence, in the same way.

The Chicago, Milwaukee & St. Paul cleaned and disinfected 5,000 stock cars between November 12 and November 23. It is also cleaning and disinfecting all its stock yards in quarantine territory, in accordance with government orders issued as a precaution against the spreading of the hoof-and-mouth disease. This order reads in part: "No railroad cars or boats, within the area hereinbefore quarantined, which have carried livestock shall be moved interstate until the said cars or boats have been cleaned and disinfected with a 5 per cent solution of carbolic acid, or a 3 per cent solution cresol compound, U. S. P., or other disinfectant permitted by the chief of the Bureau of Animal Industry." The cost of cleaning and disinfecting stock cars is $3 for a single-deck and $4 for a double-deck car. Other roads carrying stock are also taking prompt action in stamping out the disease.

Ralph Peters, chairman of the railroads' committee on mail pay has published a letter, which he has written to the chairman of the Senate committee on post offices and post roads, summarizing the arguments which the committee believes should induce Congress to reject both of the bills now before it designed to revise the method of payment for the transportation of the mails. The Moon bill is wholly objectionable; and the Bourne Committee's proposal, while in many respects acceptable to the railroads, will be opposed by them because its main feature, calling for payment by space in cars instead of by weight, is objected to as an untried experiment; and also because the rate per linear foot is too low. The railroads prefer that the present basis of payment (by weight) should be retained, the injustice to the roads being remedied by (a) weighing the mails every year instead of once in four years; (b) relieving the roads from performing side service, delivering mail bags to post offices, etc., and (c) payment for all cars used for distributing the mails. Under the law as it now stands a road receives a fixed sum for the use of a post office car if it be of full length; but for a part of a car, no space payment whatever is made.

Peter Hoffman, coroner of Cook county, Illinois, and also chairman of the Cook County Public Safety Commission, has issued a report for the year 1913, showing a reduction of 108 in fatalities on steam railroads in the county during the year, and a reduction in the same time of 21 in the street car fatalities. With the report he discussed the trespassing question and announced that the commission proposed to take steps toward influencing legislation to prohibit trespassing. Coroner Hoffman pointed out the large number of trespassers killed on railroads in the United States, saying: "By far the greater number is drawn from the resident population, laborers and others who make the tracks a thoroughfare on their way to and from work, or who walk upon the tracks when the public highways are muddy, or to make a short cut. An analysis of the character of fatalities on railroads in Cook county indicates clearly the direction which must be taken in the future. Of the 360 deaths in 1913, nine were passengers, 132 were employees and 219 were trespassers. It is up to the state and community to eliminate the useless deaths among trespassers. To that end the safety commission has taken steps toward the drafting of an anti-trespassing bill."

New York-San Francisco Water Lines

J. C. Lincoln, chief of the traffic bureau of the Merchants' Association of New York City, in announcing the abolition of numerous special freight rates on commodities by railroad to the Pacific Coast, which results in advances in the charges on these commodities, prints the following schedule showing sailings of vessels from New York to the Pacific Coast through the Panama Canal:

American-Hawaiian Steamship Company—26 vessels—To San Diego, Los Angeles Harbor, San Francisco, Portland, Seattle and Tacoma; sailing every 5 days; time in transit to San Francisco, 23 days.

Luckenbach Steamship Company—7 vessels—To Los Angeles Harbor and San Francisco; cargo for North Pacific Coast ports transshipped at San Francisco; sailing every 10 days; time in transit to San Francisco, 27 days.

Atlantic & Pacific Steamship Company, W. R. Grace & Company, agents—4 vessels—To Los Angeles Harbor, San Francisco, Portland and Puget Sound; sailing every 14 to 18 days; time in transit to San Francisco, 20 days.

Arrow Line, A. H. Bull Steamship Company, agents—3 vessels—To Los Angeles Harbor and San Francisco; sailing every 20 days; time in transit to San Francisco, 24 days.

Sudden & Christianson Steamship Company, D. B. Dearborn & Company, agents—6 vessels—To San Pedro, San Francisco and Seattle; sailing every 20 days; time in transit to San Francisco, 23 to 25 days.

Tolls amounting to $735,182 were collected from vessels using the Panama canal in the three months ending November 1. Before the canal was open to merchant ships, $11,610 had been collected on barge traffic, making the gross income to November 1 total $746,792. In October 45 vessels passed through southbound and 40 northbound, paying $377,000.

American Society of Mechanical Engineers

The annual meeting of the American Society of Mechanical Engineers, which will be held in the Engineering Societies building, New York, on December 1-4, promises to be of more than ordinary interest. The Railroad Session will be held on Wednesday afternoon to consider a report on "Steam Locomotives of Today" This was published in our issue of November 20, page 947. The indications are that it will prove to be a most successful session, as a large number have already signified their intention of being present and taking part in the discussion. Another paper which will be of special interest to railroad men is one by Robert W. Hunt on "The Mechanical Elimination of Seams in Steel Products, Notably Steel Rails." This will be presented at the Iron and Steel Session, which meets on Thursday afternoon at 2 o'clock. At this session a paper on "Factors in Hardening Tool Steel" will also be presented and there will be a topical discussion on alloy steels.

New York Railroad Club

At the meeting of the New York Railroad Club in New York on November 20, Frederick C. Syze, trainmaster of the Baltimore & Ohio at St. George, Staten Island, N. Y., was elected president, succeeding George W. Wildin. Other officers elected were: Burton P. Flory (N. Y. O. & W.), first vice-president; James Milliken (P. B. & W.), second vice-president; A. J. Stone (Erie), third vice-president, and R. M. Dixon, treasurer. The report of the secretary shows that during the year the club had gained 318 new members and that on November 1, the membership was 2,364.

MEETINGS AND CONVENTIONS

The following list gives names of secretaries, dates of next or regular meetings, and places of meeting.

AIR BRAKE ASSOCIATION.—F. M. Nellis, 53 State St., Boston, Mass. Next convention, May 4-7, 1915, Hotel Sherman, Chicago.

AMERICAN ASSOCIATION OF DEMURRAGE OFFICERS.—A. G. Thomason, Demurrage Commissioner, Boston, Mass. Annual convention, April, 1915, Richmond, Va.

AMERICAN ASSOCIATION OF DINING CAR SUPERINTENDENTS.—H. C. Boardman, D. L. & W., Hoboken, N. J. Next meeting, October, 1915.

AMERICAN ASSOCIATION OF FREIGHT AGENTS.—R. O. Wells, Illinois Central, East St. Louis, Ill. Annual meeting, May 21-24, 1915, Richmond, Va.

AMERICAN ASSOCIATION OF PASSENGER TRAFFIC OFFICERS.—W. C. Hope, C. R. R. of N. J., 143 Liberty St., New York.

AMERICAN ASSOCIATION OF RAILROAD SUPERINTENDENTS.—E. H. Harman, Room 101, Union Station, St. Louis, Mo. Next meeting, May 20-21, 1915, San Francisco, Cal.

AMERICAN ELECTRIC RAILWAY ASSOCIATION.—E. B. Burritt, 20 W. 39th St., New York. Annual convention, October, 1915, San Francisco, Cal.

AMERICAN ELECTRIC RAILWAY MANUFACTURERS' ASSOCIATION.—H. C. McConnaughy, 165 Broadway, New York. Meetings with American Electric Railway Association.

AMERICAN RAILROAD MASTER TINNERS, COPPERSMITHS AND PIPEFITTERS' ASSOCIATION.—W. E. Jones, C. & N. W., 3814 Fulton St., Chicago. Annual meeting, Chicago.

AMERICAN RAILWAY ASSOCIATION.—W. F. Allen, 75 Church St., New York. Next session, May 19, 1915, Atlantic City, N. J.

AMERICAN RAILWAY BRIDGE AND BUILDING ASSOCIATION.—C. A. Lichty, C. & N. W., Chicago. Next convention, October 19-21, 1915, Detroit, Mich.

AMERICAN RAILWAY ENGINEERING ASSOCIATION.—E. H. Fritch, 900 S. Michigan Ave., Chicago. Next convention, March 16-18, 1915, Chicago.

AMERICAN RAILWAY MASTER MECHANICS' ASSOCIATION.—J. W. Taylor, 1112 Karpen Bldg., Chicago. Annual meeting, June 9-11, 1915, Atlantic City, N. J.

AMERICAN RAILWAY SAFETY ASSOCIATION.—L. F. Shedd, C. R. I. & P., Chicago.

AMERICAN RAILWAY TOOL FOREMEN'S ASSOCIATION.—Owen D. Kinsey, Illinois Central, Chicago. Annual meeting, July, 1915.

AMERICAN SOCIETY FOR TESTING MATERIALS.—Prof. E. Marburg, University of Pennsylvania, Philadelphia, Pa.

AMERICAN SOCIETY OF CIVIL ENGINEERS.—Chas. W. Hunt, 220 W. 57th St., New York. Regular meetings, 1st and 3d Wednesday in month, except June, July and August, 220 W. 57th St., New York.

AMERICAN SOCIETY OF ENGINEERING CONTRACTORS.—J. R. Wemlinger, 11 Broadway, New York. Regular meetings, 2d Thursday in month, at 2 P. M., 11 Broadway, New York.

AMERICAN SOCIETY OF MECHANICAL ENGINEERS.—Calvin W. Rice, 29 W. 39th St., New York. Annual meeting, December 1-4, 1914, New York.

AMERICAN WOOD PRESERVERS' ASSOCIATION.—F. J. Angier, B. & O., Mt. Royal Sta., Baltimore, Md. Next convention, January 19-21, 1915, Chicago.

ASSOCIATION OF AMERICAN RAILWAY ACCOUNTING OFFICERS.—E. R. Woodson, 1300 Pennsylvania Ave., N. W., Washington, D. C. Annual convention, April 28, 1915, Atlanta, Ga.

ASSOCIATION OF MANUFACTURERS OF CHILLED CAR WHEELS.—George W. Lyndon, 1214 McCormick Bldg., Chicago.

ASSOCIATION OF RAILWAY CLAIM AGENTS.—C. W. Egan, B. & O., Baltimore, Md. Annual meeting, third week in May, 1915, Galveston, Tex.

ASSOCIATION OF RAILWAY ELECTRICAL ENGINEERS.—Jos. A. Andreucetti, C. & N. W., Room 411, C. & N. W. Sta., Chicago. Annual meeting, October, 1915.

ASSOCIATION OF RAILWAY TELEGRAPH SUPERINTENDENTS.—P. W. Drew, Soo Line, 112 West Adams St., Chicago. Annual meeting, June 22-25, 1915, Rochester, N. Y.

ASSOCIATION OF TRANSPORTATION AND CAR ACCOUNTING OFFICERS.—G. P. Conard, 75 Church St., New York. Next meeting, December 8-9, Richmond, Va.

BRIDGE AND BUILDING SUPPLY MEN'S ASSOCIATION.—L. D. Mitchell, Detroit Graphite Co., Chicago, Ill. Meetings with American Railway Bridge and Building Association.

CANADIAN RAILWAY CLUB.—James Powell, Grand Trunk, P. O. Box 7, St. Lambert (near Montreal), Que. Regular meetings, 2d Tuesday in month, except June, July and August. Windsor Hotel, Montreal, Que.

CANADIAN SOCIETY OF CIVIL ENGINEERS.—Clement H. McLeod, 176 Mansfield St., Montreal, Que. Regular meetings, 1st Thursday in October, November, December, February, March and April. Annual meeting, January, Montreal.

CAR FOREMEN'S ASSOCIATION OF CHICAGO.—Aaron Kline, 841 Lawler Ave., Chicago. Regular meetings, 2d Monday in month, except July and August, Lytton Bldg., Chicago.

CENTRAL RAILWAY CLUB.—H. D. Vought, 95 Liberty St., New York. Regular meetings, 2d Friday in January, May, September and November. Annual meetings, 2d Thursday in March, Hotel Statler, Buffalo, N. Y.

ENGINEERS' SOCIETY OF WESTERN PENNSYLVANIA.—Elmer K. Hiles, 2511 Oliver Bldg., Pittsburgh, Pa. Regular meetings, 1st and 3d Tuesday, Pittsburgh.

FREIGHT CLAIM ASSOCIATION.—Warren P. Taylor, R. F. & P., Richmond, Va. Annual meeting, June 16, 1915, Chicago.

GENERAL SUPERINTENDENTS' ASSOCIATION OF CHICAGO.—A. M. Hunter, 321 Grand Central Station, Chicago. Regular meetings, Wednesday, preceding 3d Thursday in month, Room 1856, Transportation Bldg., Chicago.

INTERNATIONAL RAILWAY CONGRESS.—Executive Committee, 11, Rue de Louvain, Brussels, Belgium. Next convention, June 23 to July 6, 1915, Berlin.

INTERNATIONAL RAILWAY FUEL ASSOCIATION.—C. G. Hall, C. & E. I., 922 McCormick Bldg., Chicago. Annual meeting, May 17-20, 1915, Chicago.

INTERNATIONAL RAILWAY GENERAL FOREMEN'S ASSOCIATION.—Wm. Hall, 829 W. Broadway, Winona, Minn. Next convention, July 14-17, 1915, Sherman House, Chicago.

INTERNATIONAL RAILROAD MASTER BLACKSMITHS' ASSOCIATION.—A. L. Woodworth, C. H. & D., Lima, Ohio. Annual meeting, August 17, 1915, Philadelphia, Pa.

MAINTENANCE OF WAY AND MASTER PAINTERS' ASSOCIATION OF THE UNITED STATES AND CANADA.—T. I. Goodwin, C. R. I. & P., Eldon, Mo.

MASTER BOILER MAKERS' ASSOCIATION.—Harry D. Vought, 95 Liberty St., New York. Annual convention, May 26 to 28, 1915, Chicago, Ill.

MASTER CAR AND LOCOMOTIVE PAINTERS' ASSOCIATION OF THE UNITED STATES AND CANADA.—A. P. Dane, B. & M., Reading, Mass. Next convention, September 14-17, 1915, Detroit, Mich.

MASTER CAR BUILDERS' ASSOCIATION.—J. W. Taylor, 1112 Karpen Bldg., Chicago. Annual meeting, June 14-16, 1915, Atlantic City, N. J.

NATIONAL RAILWAY APPLIANCES ASSOCIATION.—Bruce V. Crandall, 537 So. Dearborn St., Chicago. Next convention, March 15-19, 1915, Chicago.

NEW ENGLAND RAILROAD CLUB.—W. E. Cade, Jr., 683 Atlantic Ave., Boston, Mass. Regular meetings, 2d Tuesday in month, except June, July, August and September, Boston.

NEW YORK RAILROAD CLUB.—Harry D. Vought, 95 Liberty St., New York. Regular meetings, 3d Friday in month, except June, July and August, 29 W. 39th St., New York.

NIAGARA FRONTIER CAR MEN'S ASSOCIATION.—E. Frankenberger, 623 Brisbane Bldg., Buffalo, N. Y. Meetings monthly.

PEORIA ASSOCIATION OF RAILROAD OFFICERS.—M. W. Rotchford, Union Station, Peoria, Ill. Regular meetings, 2d Thursday in month, Jefferson Hotel, Peoria.

RAILROAD CLUB OF KANSAS CITY.—C. Manlove, 1008 Walnut St., Kansas City, Mo. Regular meetings, 3d Friday in month, Kansas City.

RAILROAD MASTER TINNERS, COPPERSMITHS AND PIPEFITTERS' ASSOCIATION.—U. G. Thompson, C. & E. I., Danville, Ill. Annual meeting, May, 1915.

RAILWAY BUSINESS ASSOCIATION.—Frank W. Noxon, 30 Church St., New York. Annual meeting, December 10, 1914, Waldorf-Astoria Hotel, New York.

RAILWAY CLUB OF PITTSBURGH.—J. B. Anderson, Room 207, P. R. R. Sta., Pittsburgh, Pa. Regular meetings, 4th Friday in month, except June, July and August, Monongahela House, Pittsburgh.

RAILWAY ELECTRICAL SUPPLY MANUFACTURERS' ASSOCIATION.—J. Scribner, 1021 Monadnock Block, Chicago. Meetings with Association of Railway Electrical Engineers.

RAILWAY FIRE PROTECTION ASSOCIATION.—C. B. Edwards, Fire Ins. Agt., Mobile & Ohio, Mobile, Ala. Next meeting, October, 1915.

RAILWAY SIGNAL ASSOCIATION.—C. C. Rosenberg, Times Bldg., Bethlehem, Pa. Next meeting, March 15, 1915, Chicago. Annual meeting, September 21-24, 1915, Salt Lake City, Utah.

RAILWAY STOREKEEPERS' ASSOCIATION.—J. P. Murphy, L. S. & M. S., Box C, Collinwood, Ohio. Annual meeting, May 17-19, 1915, Hotel Sherman, Chicago.

RAILWAY SUPPLY MANUFACTURERS' ASSOCIATION.—J. D. Conway, 2136 Oliver Bldg., Pittsburgh, Pa. Meetings with Master Car Builders and Master Mechanics' Associations.

RAILWAY TELEGRAPH AND TELEPHONE APPLIANCE ASSOCIATION.—G. A. Nelson, 50 Church St., New York. Meetings with Association of Railway Telegraph Superintendents.

RICHMOND RAILROAD CLUB.—F. O. Robinson, C. & O., Richmond, Va. Regular meetings, 2d Monday in month, except June, July and August.

ROADMASTERS' AND MAINTENANCE OF WAY ASSOCIATION.—L. C. Ryan, C. & N. W., Sterling, Ill. Annual meeting, September 14-16, 1915, Chicago.

ST. LOUIS RAILWAY CLUB.—B. W. Frauenthal, Union Station, St. Louis, Mo. Regular meetings, 2d Friday in month, except June, July and August, St. Louis.

SALT LAKE TRANSPORTATION CLUB.—R. E. Rowland, Hotel Utah Bldg., Salt Lake City, Utah. Regular meetings, 1st Saturday of each month. Salt Lake City.

SIGNAL APPLIANCE ASSOCIATION.—F. W. Edmunds, 3868 Park Ave., New York. Meeting with annual convention Railway Signal Association.

SOCIETY OF RAILWAY FINANCIAL OFFICERS.—Carl Nyquist, C. R. I. & P., La Salle St. Sta., Chicago. Annual meeting, September, 1915.

SOUTHERN ASSOCIATION OF CAR SERVICE OFFICERS.—E. W. Sandwich, A. & W. P. R. R., Atlanta, Ga. Next regular meeting, January 21, 1915, Atlanta, Ga.

SOUTHERN & SOUTHWESTERN RAILWAY CLUB.—A. J. Merrill, Grant Bldg., Atlanta, Ga. Regular meetings, 3d Thursday, January, March, May, July, September, November, 10 A. M., Candler Bldg., Atlanta.

TOLEDO TRANSPORTATION CLUB.—Harry S. Fox, Toledo, Ohio. Regular meetings, 1st Saturday in month, Boody House, Toledo.

TRACK SUPPLY ASSOCIATION.—W. C. Kidd, Ramapo Iron Works, Hillburn, N. Y. Meetings with Roadmasters' and Maintenance of Way Association.

TRAFFIC CLUB OF CHICAGO.—W. H. Wharton, La Salle Hotel, Chicago.

TRAFFIC CLUB OF NEW YORK.—C. A. Swope, 291 Broadway, New York. Regular meetings last Tuesday in month, except June, July and August, Waldorf-Astoria, New York.

TRAFFIC CLUB OF PITTSBURGH.—D. L. Wells, Erie R. R., Pittsburgh, Pa. Meetings bimonthly, Pittsburgh. Annual meeting, 2d Monday in June.

TRAFFIC CLUB OF ST. LOUIS.—A. F. Versen, Mercantile Library Bldg., St. Louis, Mo. Annual meeting in November. Noonday meetings October to May.

TRAIN DESPATCHERS' ASSOCIATION OF AMERICA.—J. F. Mackie, 7122 Stewart Ave., Chicago. Annual meeting June 15, 1915, Minneapolis, Minn.

TRANSPORTATION CLUB OF DETROIT.—W. R. Hurley, Superintendent's office, L. S. & M. S., Detroit, Mich. Meetings monthly, Normandie Hotel, Detroit.

TRAVELING ENGINEERS' ASSOCIATION.—W. O. Thompson, N. Y. C. & H. R., East Buffalo, N. Y. Annual meeting, September, 1915, Chicago.

WESTERN CANADA RAILWAY CLUB.—W. H. Rosevear, P. O. Box 1707, Winnipeg, Man. Regular meetings, 2d Monday, except June, July and August, Winnipeg.

WESTERN RAILWAY CLUB.—J. W. Taylor, 1112 Karpen Bldg., Chicago. Regular meetings, 3d Tuesday in month, except June, July and August, Karpen Bldg., Chicago.

WESTERN SOCIETY OF ENGINEERS.—J. H. Warder, 1735 Monadnock Block, Chicago. Regular meetings, 1st Monday in month, except January, July and August, Chicago. Extra meetings, except in July and August, generally on other Monday evenings.

REVENUES AND EXPENSES OF RAILWAYS

MONTH OF SEPTEMBER, 1914

Name of road.	Average mileage operated during period.	Operating revenues: Freight.	Passenger.	Total. inc. misc.	Operating expenses: Maintenance: Way and structures.	Maintenance: Of equipment.	Traffic.	Transportation.	Miscellaneous.	General.	Total.	Net operating revenue (or deficit).	Railway tax accruals.	Operating income (or loss).	Increase (or decr.) comp. with last year.
Ann Arbor	292	$152,589	$50,569	$216,491	$29,508	$31,163	$4,790	$76,599	$470	$7,669	$150,199	$66,292	$13,880	$52,412	$2,619
Arizona Eastern	367	101,431	24,644	140,479	3,423	43,844	2,028	46,184	603	10,481	106,574	33,905	13,100	20,803	—46,736
Louisville, Henderson & St. Louis	200	85,528	39,526	134,646	30,423	18,054	5,592	41,315	.....	2,996	98,380	36,266	3,800	32,465	—6,600
THREE MONTHS OF FISCAL YEAR ENDING JUNE 30, 1915															
Ann Arbor	292	$409,927	$174,641	$625,284	$73,174	$82,925	$14,233	$223,207	$1,674	$21,302	$416,515	$208,769	$41,640	$166,987	$11,920
Arizona Eastern	367	441,603	91,396	573,475	81,949	86,930	6,694	155,981	2,428	29,375	363,316	210,160	39,938	169,974	—29,676
Chicago Great Western	1,427	2,512,935	913,739	3,738,623	565,321	594,643	146,599	1,288,777	20,614	104,176	2,655,436	1,083,188	146,005	935,917	—111,395
Chicago, Indiana & Southern	359	937,650	91,807	1,069,032	157,030	239,274	19,776	345,129	5,152	38,588	804,949	264,082	57,385	206,592	122,602
Chicago, Indianapolis & Louisville	618	1,207,141	484,886	1,841,175	242,824	336,435	54,159	630,261	496	54,014	1,316,540	524,636	79,978	444,602	—32,078
Chicago Junction	12	.....	.....	487,603	65,994	54,318	2,974	249,422	.....	14,526	387,254	100,369	6,614	93,705	—79,961
Chicago, Milwaukee & St. Paul	10,015	17,070,607	5,627,473	25,254,395	3,386,687	3,317,964	460,547	9,186,412	209,570	428,889	16,270,221	8,984,174	1,233,643	7,736,865	983,634
*Chicago, Peoria & St. Louis	255	238,941	63,731	319,917	51,229	51,020	11,123	119,057	.....	10,595	243,023	76,894	11,400	65,494	79,272
Chicago, Rock Island & Gulf	477	513,004	163,902	732,059	106,383	105,344	29,477	287,415	5,479	22,169	556,268	175,791	26,444	149,231	—2,340
Chicago, Rock Island & Pacific	7,852	12,337,414	5,238,900	18,852,822	2,818,631	3,156,114	433,678	6,943,088	135,968	403,480	13,873,498	4,979,324	746,895	4,231,414	491,050
Chicago, St. Paul, Minn. & Omaha	1,753	2,992,203	1,591,745	4,934,766	739,086	631,467	88,434	1,631,668	49,340	106,435	3,246,429	1,668,337	273,859	1,413,830	329,974
Chicago, Terre Haute & Southeastern	375	521,431	56,517	595,379	92,117	128,680	8,801	163,945	2,560	27,922	424,025	171,354	34,500	136,854	58,365
Cincinnati, Hamilton & Dayton	1,015	2,090,805	472,714	2,856,096	389,477	466,099	56,046	1,178,776	.....	56,180	2,146,578	709,519	115,494	593,055	168,894
Cincinnati, New Orleans & Texas Pacific	337	1,854,912	444,750	2,435,444	263,798	701,571	74,573	754,680	13,121	63,697	1,871,440	564,004	93,000	471,004	—250,272
Cincinnati Northern	246	344,191	75,699	439,204	65,620	75,477	8,163	134,082	.....	9,861	293,204	145,999	18,000	127,741	131,301
Cleveland, Cincinnati, Chic. & St. Louis	2,361	6,504,485	2,525,106	9,883,428	1,120,891	1,892,423	224,991	3,569,404	78,040	184,094	7,057,243	2,826,185	384,500	2,440,544	1,303,165
Colorado & Southern	1,127	1,348,265	503,488	1,989,617	318,770	473,145	33,693	612,070	15,798	56,124	1,509,599	480,018	106,875	372,831	—265,783
Colorado Midland	338	393,263	97,990	542,178	104,372	115,971	24,518	209,905	5,144	16,953	476,808	65,370	25,590	39,780	34,767
Cumberland Valley	164	560,048	193,718	795,732	145,592	94,526	12,885	264,859	2,360	23,092	543,313	252,418	17,732	234,687	—26,987
Delaware & Hudson Co.—R. R. Dept	881	4,765,539	1,063,828	6,169,416	434,881	851,076	81,313	2,115,193	43,620	175,164	3,692,481	2,476,935	168,750	2,308,062	.....
Delaware, Lackawanna & Western	960	7,723,642	2,518,258	11,324,747	1,562,990	1,791,236	212,585	3,354,785	107,086	217,195	7,182,783	4,141,964	555,000	3,586,591	—42,218
Denver & Rio Grande	2,562	4,436,924	1,480,879	6,381,747	1,157,628	1,136,470	119,864	1,774,136	104,202	170,466	4,456,905	1,924,841	270,000	1,654,687	—48,358
Denver & Salt Lake	255	323,864	142,813	494,919	56,927	85,010	8,802	148,665	.....	16,859	313,579	181,340	14,000	167,340	—10,284
Detroit & Mackinac	400	179,779	98,296	302,668	38,131	48,029	5,947	102,918	992	7,977	203,993	98,675	27,397	71,277	—16,076
Detroit & Toledo Shore Line	79	335,694	.....	336,705	51,371	26,443	4,530	96,364	.....	7,723	186,430	150,275	17,700	132,575	—40,906
Detroit, Grand Haven & Milwaukee	191	386,000	201,000	674,116	125,008	99,752	22,303	325,751	3,456	14,276	590,545	83,571	10,080	73,382	—51,451
Detroit, Toledo & Ironton	441	434,989	59,303	525,697	60,324	59,453	10,065	261,618	.....	18,366	409,827	115,871	18,000	97,871	253,393
Duluth & Iron Range	292	1,952,241	58,801	2,081,585	291,289	227,583	3,904	376,650	11,363	25,362	936,151	1,145,434	110,793	1,034,642	—965,498
Duluth, Missabe & Northern	364	2,320,370	92,976	2,466,458	244,199	238,938	6,646	383,792	10,483	27,976	912,035	1,554,423	125,810	1,428,614	—1,004,269
Duluth, South Shore & Atlantic	627	478,099	298,587	866,010	179,932	112,768	24,498	299,088	13,027	37,194	666,506	199,504	57,000	142,472	—14,984
Duluth, Winnipeg & Pacific	185	269,664	57,519	335,855	95,872	65,765	6,826	123,847	2,166	18,871	313,346	22,509	16,793	5,716	—75,781
El Paso & Southwestern Co	1,028	1,518,837	334,459	2,019,172	252,928	281,615	53,618	539,402	17,850	66,634	1,212,049	807,123	114,632	692,160	131,464
Elgin, Joliet & Eastern	777	2,352,154	23	2,495,563	252,391	425,729	15,228	664,917	.....	52,358	1,410,369	1,085,193	98,499	986,694	—160,514
Erie	1,988	10,855,453	2,801,408	14,923,540	1,663,312	3,467,759	275,155	5,032,238	105,559	298,730	10,811,203	4,112,337	415,640	3,691,307	—326,946
Florence & Cripple Creek	87	234,011	65,877	305,221	42,169	28,801	6,610	94,454	.....	12,906	184,941	120,281	17,030	103,250	—63,945
Florida East Coast	696	458,105	323,617	905,565	190,044	149,473	18,337	365,661	8,414	65,507	784,813	120,752	60,000	60,706	136,451
Fort Worth & Denver City	454	795,402	435,660	1,307,109	131,694	192,316	26,706	495,634	11,348	41,488	899,186	407,924	36,597	371,042	94,004
Galveston, Harrisburg & San Antonio	1,338	2,101,206	846,284	3,139,416	398,636	511,125	82,703	1,233,753	27,553	103,831	2,355,350	784,067	118,276	665,482	2,161
Georgia	307	458,745	230,798	747,734	89,385	153,203	37,023	336,815	.....	23,005	639,431	108,303	10,317	97,938	6,327
Georgia, Southern & Florida	395	338,546	190,027	602,649	80,418	130,876	23,010	239,244	23	28,562	502,135	100,514	32,828	67,326	6,760
Grand Rapids & Indiana	575	753,239	681,144	1,571,034	172,977	200,364	29,473	591,625	11,430	40,248	1,046,117	524,917	72,712	452,205	86,620
Grand Trunk Western	347	1,219,000	570,000	1,903,697	286,346	354,868	62,241	743,486	30,321	44,159	1,521,421	382,276	107,760	274,358	40,516
Great Northern	8,023	15,456,885	4,406,885	21,838,135	2,274,811	1,973,231	319,158	5,088,783	247,272	318,893	10,203,561	11,634,573	1,176,560	10,457,222	743,972
Gulf & Ship Island	308	315,566	93,852	436,132	55,245	86,885	7,687	114,023	774	22,197	286,812	149,320	21,955	127,320	—79,935
Gulf, Colorado & Santa Fe	1,937	2,972,467	915,936	4,094,741	524,999	595,340	84,095	1,391,922	.....	99,879	2,696,235	1,398,506	153,166	1,244,318	516,142
Hocking Valley	353	1,517,301	256,007	1,913,394	258,290	344,444	24,908	557,246	.....	38,838	1,223,726	689,668	116,400	573,268	—194,027
Houston & Texas Central	854	1,131,812	465,912	1,711,072	327,996	262,472	46,101	675,395	4,955	51,274	1,367,123	343,950	72,141	271,548	—128,987
Houston East & West Texas	191	223,261	101,539	342,632	82,212	61,567	5,960	131,967	.....	8,966	290,460	52,172	12,747	39,342	—51,986
Illinois Central	4,769	11,813,684	3,693,699	16,770,905	2,508,819	3,787,581	296,878	5,728,978	91,178	362,029	12,713,679	4,057,226	825,000	3,226,327	337,896
Indiana Harbor Belt	105	.....	.....	863,646	122,436	98,600	7,806	338,266	.....	23,137	590,245	273,401	23,355	249,826	81,078
International & Great Northern	1,160	1,499,771	561,635	2,227,540	437,791	385,458	73,509	1,065,917	8,993	92,621	2,064,290	163,250	80,000	82,993	—637,975
Kanawha & Michigan	177	794,201	99,667	913,649	117,824	205,574	7,249	244,955	12	20,493	596,108	317,541	35,462	282,064	—1,742
Kansas City Southern	827	2,008,015	432,893	2,690,074	306,285	330,947	79,768	859,226	.....	123,866	1,697,114	992,960	141,843	850,488	—25,056
Lake Erie & Western	906	1,290,788	245,165	1,612,392	209,575	230,595	38,947	579,426	.....	35,082	1,093,625	518,767	73,000	444,809	201,831
Lake Shore & Michigan Southern	1,852	8,482,754	3,782,947	14,086,708	1,605,623	2,689,914	217,718	4,567,599	166,326	277,547	9,524,727	4,561,981	589,500	3,970,524	—323,530
Lehigh & Hudson River	97	416,659	32,590	456,697	72,226	57,399	4,012	159,280	.....	10,544	303,460	153,237	12,450	140,787	58,210
Lehigh & New England	294	670,363	4,759	705,037	90,865	94,610	5,272	164,624	.....	17,814	373,185	331,852	17,009	314,843	142,238
Lehigh Valley	1,444	9,268,097	1,372,499	11,268,255	1,215,540	2,294,362	228,163	3,688,883	43,730	207,362	7,678,041	3,590,215	417,000	3,171,047	—101,758
Long Island	398	954,245	2,840,784	4,325,012	381,440	352,379	44,550	1,519,590	19,158	77,221	2,394,336	1,930,676	195,711	1,733,943	256,135

REVENUES AND EXPENSES OF RAILWAYS

THREE MONTHS OF FISCAL YEAR ENDING JUNE 30, 1915—CONTINUED

Name of road.	Average mileage operated during period.	Operating revenues			Operating expenses							Net operating revenue (or deficit).	Railway tax accruals.	Operating income (or loss).	Increase (or decr.) comp. with last year.
					Maintenance										
		Freight.	Passenger.	Total. inc. misc.	Way and structures.	Of equipment.	Traffic.	Transportation.	Miscellaneous.	General.	Total.				
Louisiana & Arkansas	279	$377,705	$66,676	$457,550	$94,444	$75,016	$7,907	$115,738	.....	$13,078	$306,059	$151,491	$18,750	$132,741	—$11,997
Louisiana Ry. & Navigation	351	391,768	73,263	497,594	101,357	47,976	17,034	188,733	.....	15,104	370,204	127,391	24,500	102,891	18,463
Louisiana Western	208	352,717	182,114	566,459	60,767	102,498	20,560	154,059	$9,155	19,525	366,508	199,951	26,206	173,691	20,579
Louisville & Nashville	5,020	9,988,534	3,194,584	14,110,885	2,272,643	2,866,495	332,216	4,722,215	46,036	308,266	10,540,519	3,570,366	552,825	3,015,662	—250,755
Louisville, Henderson & St. Louis	200	250,530	116,287	390,191	81,303	53,688	15,611	120,039	.....	9,454	280,095	110,096	11,400	98,687	2,294
Maine Central	1,209	1,691,368	1,212,704	3,137,868	443,317	431,354	42,041	1,125,252	27,505	79,779	2,149,249	988,620	156,388	832,232	105,268
Michigan Central	1,800	5,208,215	2,778,893	9,000,384	935,537	1,326,971	192,115	3,340,609	147,932	161,423	6,104,587	2,895,797	402,000	2,493,501	785,663
Midland Valley	380	228,210	117,435	367,742	82,820	80,930	6,102	123,917	.....	17,042	310,810	56,932	19,746	36,998	—24,184
Minneapolis & St. Louis	1,646	1,927,865	585,620	2,664,454	317,000	397,587	54,670	929,550	250	59,484	1,758,542	905,912	113,304	792,608	79,128
Minn., St. Paul & Sault Ste. Marie	4,102	5,368,965	1,911,568	7,875,659	1,081,116	1,129,079	143,424	2,333,363	51,224	150,139	4,866,928	3,008,730	350,238	2,658,492	28,791
Missouri & North Arkansas	365	190,131	118,586	331,508	88,607	61,593	11,608	149,828	.....	18,082	329,718	1,790	18,000	—16,391	—63,465
Missouri, Kansas & Texas System	3,865	5,195,798	2,316,518	8,108,774	1,125,746	1,319,664	174,433	2,917,655	85,977	273,159	5,830,192	2,278,582	337,064	1,940,338	—238,534
Missouri, Oklahoma & Gulf	332	224,144	67,538	307,008	60,684	47,321	12,524	127,961	291	16,095	264,876	42,132	19,392	22,562	10,590
Missouri, Oklahoma & Gulf of Texas	19	25,780	1,320	27,858	3,616	7,489	647	13,293	.....	1,615	26,659	1,199	590	609	2,221
Missouri Pacific	3,920	5,967,590	1,398,089	7,993,666	991,655	1,408,023	182,776	2,755,269	27,208	189,154	5,554,085	2,439,581	295,770	2,142,652	745,931
Mobile & Ohio	1,122	2,508,153	386,827	3,056,952	377,493	685,908	125,152	1,171,019	8,682	86,531	2,454,784	602,168	99,736	502,406	—171,020
Monongahela	67	268,743	6,953	281,343	53,623	19,956	2,046	66,407	.....	5,983	148,014	133,329	6,300	127,029	—104,298
Morgan's La. & Tex. R. R. & S. S. Co.	405	732,240	281,448	1,091,062	143,267	240,933	33,645	432,665	7,988	35,848	894,228	196,834	61,176	134,679	—8,680
Nashville, Chattanooga & St. Louis	1,231	1,960,517	763,977	2,966,708	410,653	617,623	131,994	1,153,317	30,890	87,718	2,432,195	534,512	81,639	452,659	—54,840
Nevada Northern	165	274,563	33,501	320,097	59,517	44,579	1,375	72,568	179	11,903	190,121	129,976	16,925	113,051	—88,588
New Orleans & North Eastern	204	690,939	451,642	923,625	100,171	203,077	28,910	325,573	17,434	34,649	709,814	213,811	44,700	169,111	—42,558
New Orleans Great Northern	283	301,893	88,410	429,122	51,229	62,151	7,692	126,871	583	19,186	267,712	161,410	9,500	151,910	—38,849
New Orleans, Mobile & Chicago	403	372,270	92,891	491,987	89,948	75,504	12,045	160,372	—17	20,710	358,562	133,425	18,549	114,851	—71,636
New Orleans, Texas & Mexico	286	322,899	64,165	407,241	87,076	48,313	13,570	151,895	.....	23,407	324,261	82,980	4,863	78,117	14,000
New York Central & Hudson River	3,692	15,628,945	9,928,627	29,971,014	3,566,368	5,279,346	463,993	10,037,024	565,982	695,051	20,607,764	9,363,250	1,535,448	7,826,944	566,265
New York, Chicago & St. Louis	568	2,225,851	451,110	2,816,601	403,056	309,586	120,400	1,222,301	18,026	57,711	2,131,079	685,521	126,000	559,229	37,243
New York, New Haven & Hartford	2,003	7,838,656	7,698,201	17,314,921	2,342,449	2,397,344	114,596	6,235,880	138,949	382,422	11,605,373	5,709,548	735,000	4,973,473	—66,783
New York, Ontario & Western	568	1,668,600	769,995	2,815,260	387,840	442,672	25,289	943,424	.....	45,318	1,844,543	970,717	58,749	911,938	—14,758
New York, Philadelphia & Norfolk	112	853,780	157,794	1,106,703	107,764	202,980	13,814	436,263	14,235	28,479	803,535	303,168	26,100	277,068	20,928
New York, Susquehanna & Western	140	525,519	149,558	746,849	79,810	85,008	6,264	318,368	.....	17,238	506,636	240,213	37,750	191,066	45,364
Norfolk & Western	2,037	10,020,471	1,386,014	11,831,020	1,879,935	2,232,418	178,038	3,303,329	28,180	199,836	7,681,904	4,149,116	420,000	3,729,115	173,974
Norfolk Southern	900	587,116	332,689	1,001,122	154,529	159,053	22,317	360,885	.....	59,048	755,831	245,291	37,000	208,291	—53,157
Northern Pacific	6,409	12,431,140	4,500,226	18,601,841	2,973,269	2,764,768	296,962	5,196,495	281,139	264,599	11,477,505	7,124,336	1,233,801	5,890,099	—521,867
Northwestern Pacific	401	453,504	632,851	1,202,701	183,286	120,379	14,498	373,197	.....	28,019	704,214	498,487	47,955	450,532	—39,637
Oahu Ry. & Land Co.	109	332,553	70,740	421,995	31,092	30,355	1,888	69,758	.....	11,518	144,612	277,383	21,750	255,633	38,496
Oregon Short Line	2,160	3,988,623	1,357,223	5,778,768	856,305	695,371	87,428	1,372,699	91,673	163,850	3,221,953	2,556,815	349,500	2,206,788	—229,249
Oregon-Washington R. R. & Nav. Co.	1,935	2,833,458	1,367,212	4,540,088	468,549	491,287	112,108	1,400,874	43,455	168,126	2,647,104	1,892,984	291,214	1,601,418	177,816
Panhandle & Santa Fe	668	728,519	182,713	957,637	169,441	187,187	11,253	295,977	.....	26,611	690,470	267,168	27,701	239,108	146,060
Pennsylvania *Company*	1,750	11,558,935	2,860,917	15,966,068	2,181,555	2,623,460	222,480	5,300,415	116,084	329,501	10,773,496	5,192,572	818,508	4,373,754	—794,538
Pennsylvania *Railroad*	4,519	34,477,099	10,997,372	49,838,198	6,311,012	9,016,596	568,926	17,537,594	723,925	1,212,550	35,370,603	14,467,595	1,970,422	12,492,227	504,924
Pere Marquette	2,321	3,005,751	1,327,246	4,747,397	452,459	891,706	95,461	1,670,123	18,103	152,822	3,278,528	1,468,868	159,551	1,308,803	831,530
Philadelphia & Reading	1,198	9,627,426	1,852,918	12,031,895	1,313,830	2,190,893	139,302	4,080,380	40,055	204,437	7,968,897	4,062,998	302,368	3,759,156	—261,163
Philadelphia, Baltimore & Washington	717	2,871,363	2,167,125	5,570,034	840,909	988,930	77,161	2,270,470	41	130,883	4,308,394	1,261,639	170,470	1,090,998	241,221
Pittsburgh & Lake Erie	224	3,709,183	494,504	4,380,986	536,407	981,166	39,899	1,051,665	11,113	82,898	2,703,148	1,677,838	155,350	1,522,488	—663,980
Pittsburgh, Cincinnati, Chic. & St. Louis	1,472	7,303,584	2,331,218	10,780,557	1,399,898	1,881,591	190,578	3,628,854	77,243	231,360	7,409,523	3,371,033	499,760	2,870,888	386,943
Pittsburgh, Shawmut & Northern	294	412,977	37,920	457,962	139,773	154,237	4,543	149,546	.....	12,380	460,478	—2,516	4,953	—7,468	—49,438
Port Reading	21	290,304	.....	355,902	50,421	33,066	115	112,711	.....	1,740	198,054	157,848	36,000	121,848	646
Richmond, Fredericksburg & Potomac	88	373,573	225,909	684,042	62,166	90,490	10,966	255,270	4,111	20,899	443,902	240,140	22,911	217,200	21,792
Rutland	468	510,062	339,570	968,226	124,451	168,380	26,560	364,643	3,981	16,307	704,321	263,904	51,556	212,349	—68,491
St. Joseph & Grand Island	258	355,305	88,896	477,398	99,999	59,461	14,646	159,956	.....	17,092	351,154	126,244	21,131	105,105	43,641
St. Louis & San Francisco	4,746	7,055,863	3,044,882	10,773,251	1,422,306	1,705,833	201,951	3,562,848	.....	255,831	7,148,768	3,624,484	351,118	3,270,613	—285,859
St. Louis, Brownsville & Mexico	548	362,789	220,668	636,393	114,403	62,301	15,720	238,095	.....	31,700	455,275	181,119	20,250	160,869	—51,472
St. Louis, Iron Mountain & Southern	3,365	5,913,531	1,554,045	8,040,720	1,136,757	1,461,622	161,573	2,486,071	29,003	179,271	5,454,297	2,586,423	339,096	2,245,237	—165,507
St. Louis, Merchants' Bridge Terminal	9	.....	746	478,392	62,954	17,269	2,247	229,547	.....	21,472	333,489	144,904	22,240	122,664	80,517
St. Louis, San Francisco & Texas	244	228,506	90,981	341,672	79,016	52,648	7,359	150,668	.....	14,934	304,625	37,047	3,982	33,062	—97,500
St. Louis Southwestern	943	1,365,269	355,441	1,826,567	223,446	309,961	76,661	486,970	11,036	74,295	1,181,921	644,646	88,878	555,570	—198,947
St. Louis Southwestern of Texas	811	567,723	289,927	934,903	242,419	235,152	35,968	421,591	3,173	48,642	984,939	—50,036	40,500	—90,801	—72,380
San Antonio & Aransas Pass	724	704,822	361,612	1,135,670	176,481	193,388	20,154	502,904	.....	33,615	926,542	209,128	36,000	172,992	—290,081
San Pedro, Los Angeles & Salt Lake	1,132	1,521,347	686,797	2,434,756	285,355	393,197	95,917	774,574	42,314	55,003	1,646,360	788,395	121,436	666,487	—9,338
Seaboard	3,098	3,321,496	1,222,574	5,099,035	617,065	818,334	197,857	1,913,567	19,979	161,489	3,726,034	1,373,001	273,000	1,099,506	—205,314
Southern	7,036	10,432,916	5,051,655	16,902,895	2,390,453	3,151,261	578,420	6,190,921	114,237	519,255	12,926,315	3,976,580	660,182	3,312,304	—842,922
Southern in Mississippi	281	144,437	98,135	265,366	73,228	27,894	7,454	122,150	.....	10,734	241,460	23,906	23,250	597	7,849
Southern Pacific	6,501	16,494,786	7,521,107	26,491,226	2,709,432	3,755,986	466,350	8,135,001	425,859	686,923	16,148,812	10,342,415	1,274,695	9,061,918	—780,639
Spokane International	163	174,217	55,211	241,542	39,703	15,831	6,948	68,245	.....	10,650	141,378	100,165	11,789	88,375	—29,912

Traffic News

The trunk lines have filed at Washington freight tariffs, to take effect December 15, in which the rates on grain and grain products from the west to the Atlantic seaboard are increased one cent per 100 lb. For example, from Chicago to New York grain, now 16 cents per 100 lb. for domestic delivery and 13 cents for export, will be 17 cents and 14 cents respectively. The proposed advances in the rates on livestock have been made the subject of complaint presented to the commission at Washington, charging unreasonableness.

The increases in freight rates which have been filed by the western railroads have been complained of in a petition, presented to the Interstate Commerce Commission, which it is said has the signatures or endorsement of the state commissioners of Iowa, Nebraska, North Dakota, South Dakota, Montana, Minnesota, Missouri, Kansas, Texas, Oregon, Washington and California. The federal body is asked to suspend the new tariffs. These tariffs do not as a rule affect class rates but make advances in a large number of important commodities.

On the occasion of the Yale-Harvard footfall game at New Haven, November 21, the New York, New Haven & Hartford carried 33,378 persons to New Haven, delivering them all within four hours. Including the travel to New Haven the night before the big game, about 37,500 persons were carried to New Haven from all points on the New Haven system. This breaks all records for travel on that road. The performance of the morning, when this crowd was transported to New Haven within four hours, was repeated Saturday evening. Between 5:20 and 6:20 Saturday evening there were taken out of the station at New Haven approximately 18,000 people, or 300 a minute. A total of 65 trains and 618 cars were used in moving the football crowd. Forty-three of these trains were special trains. These 65 trains were moved over the road and their 33,378 passengers loaded and unloaded without serious mishap of any kind. Within the four-hour period Saturday morning 27 trains were despatched from New York carrying 17,800 passengers; 18 from Boston carrying 7,474; 5 from Springfield carrying 3,907, and 3 from Hartford carrying 1,254. Twelve trains from New London, Waterbury, Maybrook, Bridgeport, Pittsfield, Northampton and Willimantic carried 2,943 passengers, bringing the total carried to New Haven in the morning up to 33,378. Of the 43 special trains run into New Haven on Saturday 16 arrived ahead of schedule time; 18 were less than 5 minutes late and only 9 more than 5 minutes late. The total time lost by the 43 specials was 166 minutes, which would mean an average of only 3½ minutes per train. The first special returning to New York left New Haven at 4:40 p. m., and the last at 8:02 p. m.

Increased Passenger Fares

Extensive changes in passenger tariffs, making small advances in the rates, together with other changes in suburban fares around Philadelphia were noticed last week, page 980. Further details of the changes on long distance routes are noted below. In addition to these announcements there are other increases in fares, literally too numerous to mention. Changes in suburban rates, similar to those announced at Philadelphia, are to be made also at Baltimore. The regular weekly circular of the New York State Public Service Commission, Second district, contains a dozen or more announcements of withdrawals of certain forms of tickets, mostly round trip local tickets sold at considerable reductions from the single trip rate, these being issued by the Erie, the New York Central, the Lackawanna, the Lehigh Valley and the Pennsylvania. These withdrawals all mean increased fares. The New York, Ontario & Western, which for a good many years has had a uniform passenger rate of two cents a mile, announces an increase to 2½ cents, taking effect December 15. These numerous New York tariffs include also some reductions in rates.

Citizens in and around Philadelphia have complained of the proposed advances in rates to and from that city, both to the federal and the state authorities. The Public Utilities Commission of New Jersey has suspended for three months all increases in such of the tariffs as are subject to the authority of that commission. The Pennsylvania Public Service Commission announces that it has no power to suspend the proposed increases, but that probably it will require the railroads to issue conditional rebate certificates with sales of tickets at the advanced rates, with a view of ordering refund of a part of the money in case, on investigation, the commission shall decide that the advances are not justified.

New Trunk Line Passenger Fares

The railways in the Trunk Line Association have filed with the Interstate Commerce Commission tariffs advancing passenger fares in Trunk Line territory and between points in Trunk Line and Central Passenger Association territories to a basis of approximately 2½ cents a mile, effective on December 15. Increased fares in Central Passenger Association territory, as previously reported, have been filed to become effective on December 1. Some of the principal changes in the standard fares are shown in the following tables:

FROM NEW YORK

To—	Present rate	New rate
Pittsburgh	$10.50	$11.00
Cleveland	13.00	13.10
Columbus, O.	14.60	15.78
Cincinnati	17.00	18.68
Louisville	20.00	21.68
Indianapolis	18.50	20.15
Chicago	20.00	21.10
St. Louis	24.25	24.75

FROM CHICAGO

To—	Present rate	New rate
Cincinnati	$ 6.00	$ 7.00
Detroit	7.00	7.40
Toledo	5.50	5.85
Buffalo	12.00	13.10
Indianapolis	3.70	4.60
Washington	17.50	18.00
Baltimore	17.50	18.00
Philadelphia	18.22	19.10
New York	20.00	21.10
Boston	22.00	23.10
St. Louis	5.80	7.50

FROM ST. LOUIS

To—	Present rate	New rate
Chicago	$ 5.80	$ 7.50
Cincinnati	8.00	8.65
Toledo	10.80	11.10
Cleveland	12.30	13.25
Buffalo	16.30	17.35
Pittsburgh	14.00	15.48
Washington	20.25	22.00
New York	24.25	24.75
Boston	24.80	26.35

By the differential lines the advances are the same, for example, New York and Chicago, the advance is from $18 to $19.10.

Quarantines

The restrictions on the transportation of live stock, imposed because of the prevalence of the foot and mouth disease continue strict throughout the Central States, and at many points outside those states. The requirements as to inspection and certificate apply not only to animals but also to straw imported from foreign countries, used as packing for merchandise, and also (at many places) wool. It is said that in the state of New York, the disease has been confined to 13 farms. Here and elsewhere the authorities appear to feel satisfied that the epidemic has been satisfactorily checked, but precautions are continued.

In northern New York the federal government has imposed a quarantine on potatoes because of the existence in that region of powdery scab.

In parts of Maine, New Hampshire, Massachusetts and Connecticut, the Department of Agriculture has imposed a quarantine on the transportation of stone taken out of quarries, the reason being that stone has been found to carry eggs of the gipsy moth. The Boston office of the United States Department of Agriculture, 43 Tremont street, issues regulations under which stone may be transported in interstate commerce.

Reductions in Passenger Train Service

A large number of reductions in passenger train service have been announced by railroads both east and west of Chicago to take effect on or about November 30. Both the Chicago & North Western and the Chicago, Burlington & Quincy on November 29 will take off one train a day between Chicago and Denver, and from Chicago to Denver trains now leaving in the evening will be changed to a morning schedule to take the place of other

morning trains taken off. From Denver to Chicago a train now leaving in the morning will be changed to leave in the evening. The Burlington's Denver Limited, now leaving Chicago at 5 p. m., will take the place of the train now leaving at 9:45 a. m. The train on the Union Pacific between Omaha and Denver, which connects with the North Western train to Omaha will be discontinued, but the North Western will continue the train to Omaha, discontinuing another train from Omaha to Chicago. The Burlington will also discontinue one train between Kansas City and St. Joseph, and will make other reductions in local train service, making a total reduction of about 76,000 train miles a month. The Denver & Rio Grande will discontinue four trains between Denver and Ogden, and the Western Pacific will make a reduction in service between Salt Lake City and San Francisco. East of Chicago a number of reductions will be made in local train service.

Car Balance and Performance

Arthur Hale, chairman of the committee on relations between railroads, of the American Railway Association, in presenting statistical bulletin No. 180, covering car balances and performances for July, 1914, says:

The committee presents herewith statistical bulletin No. 180, covering car balance and performance for July, 1914.

The average miles per car per day were 22.5, compared with 22.7 for June. This figure for July, 1913, was 23.7.

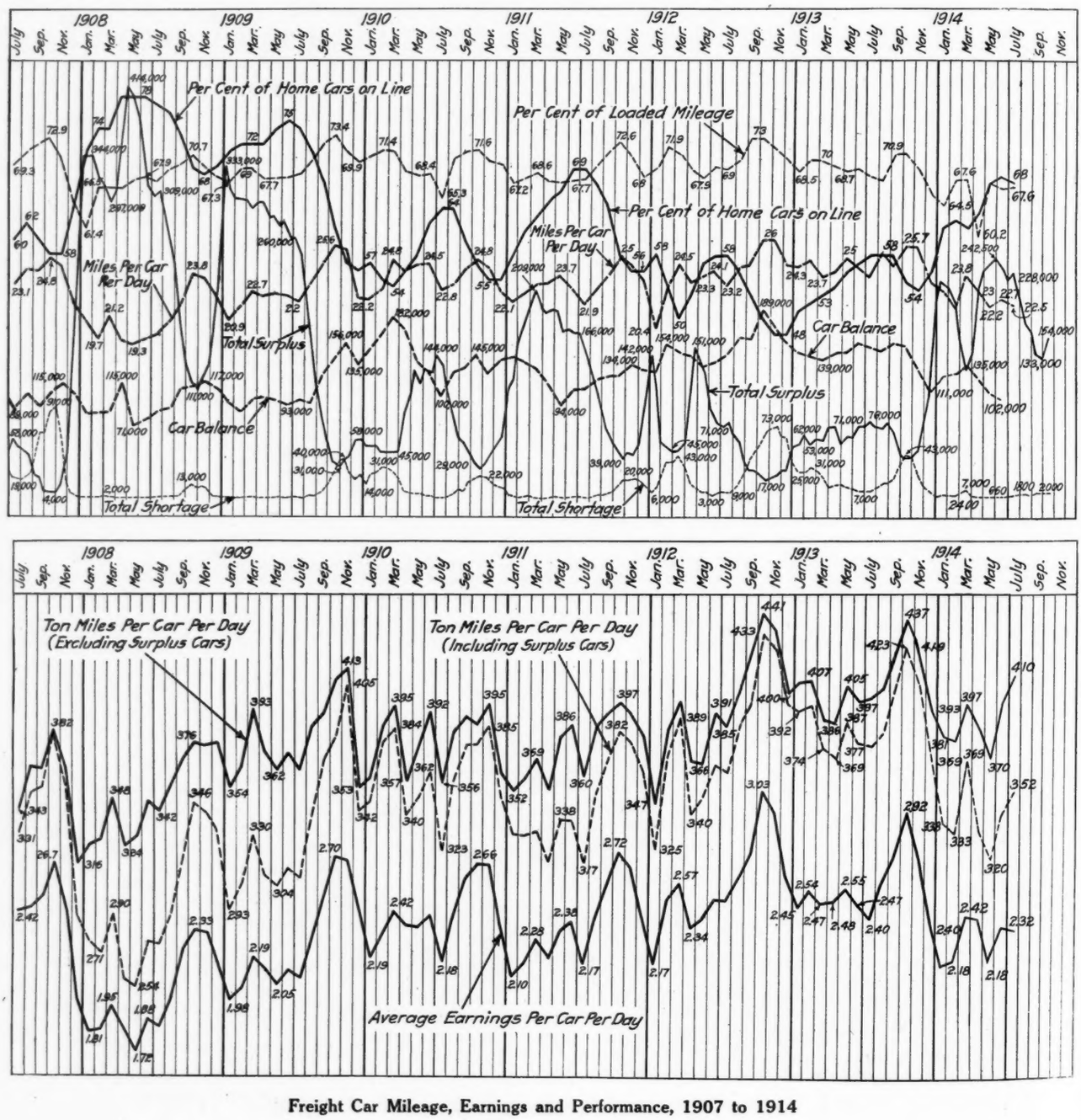
Ton miles per car per day for July were 352, compared with 345 for June. This is a decrease of 6.13 per cent compared with the figure for July, 1913, which was 375.

The proportion of home cars on line was 68 per cent, compared with 69 per cent in June. This is an increase of 9 points over July, 1913.

The per cent of loaded car mileage was 67.6 per cent, which is the same as the June figure. This figure for July, 1913, was 68.1 per cent.

The average earnings per car per day for all cars on line was $2.32. This figure for July, 1913, was $2.40.

The accompanying table gives car balance and performance in the month covered by the report, and the diagram shows car earnings and car mileage and different car performance figures monthly from July, 1907.



Freight Car Mileage, Earnings and Performance, 1907 to 1914

CAR BALANCE AND PERFORMANCE FOR JULY, 1914

	New England.	N. Y., N. J., Del., Md., Eastern Pa.	Ohio, Ind., Mich., Western Pa.	Va., W. Va., No. and So. Carolina.	Ky., Tenn., Miss., Ala., Ga., Fla.	Iowa, Ill., Wis., Minn., Dakotas.	Mont., Wyo., Neb.	Kan., Colo., Okla., Mo., Ark.	Texas, La., New Mex.	Ore., Idaho, Nev., Cal., Ariz.	Canadian Lines.	Grand Total.
Revenue freight cars owned	81,556	716,093	205,384	199,089	174,967	456,105	23,724	144,970	31,784	143,694	179,770	2,357,136
Average number of system cars on line	54,922	468,041	153,467	129,728	111,432	347,385	11,067	93,990	24,974	84,334	129,727	1,609,067
Railway-owned cars: Average foreign on line	31,416	214,487	84,750	51,565	46,293	114,985	9,605	52,981	19,680	38,673	29,405	693,840
Total railway-owned cars on line	86,338	682,528	238,217	181,293	157,725	462,370	20,672	146,971	44,654	123,007	159,132	2,302,907
Excess	4,782	*33,565	32,833	*17,796	*17,242	6,265	*3,052	2,001	12,870	*20,687	*20,638	*54,229
Per cent of cars on line to total owned:												
Home	67	65	75	65	64	76	47	65	78	59	72	68
Foreign	39	30	41	26	26	25	40	36	62	27	16	30
All railways	106	95	116	91	90	101	87	101	140	86	88	98
Private cars on line	3,101	30,809	8,648	4,254	10,560	16,060	2,056	9,837	3,215	9,692	2,913	101,145
Total, all cars on line	89,439	713,337	246,865	185,547	168,285	478,430	22,728	156,808	47,869	132,699	162,045	2,404,052
Per cent of cars in shop	10.06	8.40	13.36	11.17	11.62	6.05	5.94	10.04	8.60	6.46	5.50	8.82
No. of freight engines owned	1,214	11,311	3,099	3,286	2,972	7,369	492	2,966	875	2,918	2,616	39,118
Average cars on line per freight engine owned	74	63	80	56	57	65	46	53	55	45	62	61
Total freight-car mileage	46,825,051	479,762,771	141,806,659	143,136,152	137,690,142	325,693,597	30,571,253	102,501,387	38,307,038	122,173,411	104,836,406	1,673,303,867
Average miles per car per day	16.9	21.7	18.5	24.9	26.4	22.0	43.4	22.0	25.8	29.7	20.9	22.5
Per cent loaded mileage	69.6	65.3	65.9	64.5	69.1	69.5	66.0	69.6	68.6	69.6	72.0	67.6
Ton-miles of freight, including company freight	543,014,974	7,995,858,261	2,430,341,881	2,393,429,983	2,002,004,169	3,616,961,272	431,302,765	1,146,484,641	414,039,448	1,767,542,182	1,511,529,639	24,252,509,215
Average ton-miles, including company freight:												
Per car-mile	11.6	16.9	17.7	16.7	14.5	14.3	14.1	13.9	14.3	14.7	14.4	15.5
Per loaded car-mile	16.7	25.8	26.8	25.9	21.0	20.6	21.4	19.9	21.2	21.2	20.0	23.0
Per car per day	196	367	329	416	384	315	612	323	384	435	301	352
Gross freight earnings	$6,080,625	$48,235,016	$13,377,466	$12,590,358	$12,286,169	$33,231,973	$3,123,934	$11,517,037	$4,046,547	$17,340,854	$10,710,127	$172,540,106
Average daily earnings: Per car owned	$2.41	$2.18	$2.10	$2.04	$2.26	$2.35	$4.25	$2.56	$4.11	$3.91	$1.92	$2.36
Per railroad car on line	2.27	2.28	1.81	2.24	2.51	2.32	4.87	2.53	2.92	4.56	2.17	2.42
All cars on line	2.19	2.18	1.75	2.19	2.36	2.24	4.43	2.37	2.73	4.23	2.13	2.32

*Denotes deficiency.

Commission and Court News

INTERSTATE COMMERCE COMMISSION

Special Examiner Kelly held a hearing in Chicago on November 19, on complaints of shippers of blooded livestock regarding the present rates, weights and requirements for the shipment of livestock in less-than-carload lots.

The commission has suspended until March 31 tariffs which have been filed by both eastern and western roads, increasing charges for so-called trap car service. These trap car tariffs, so far as they affect intrastate traffic have been suspended in Illinois by the state commission.

Examiner Pattison held a hearing at Denver last week on complaints filed by the Gould lines against the notice recently issued by the Union Pacific, which would have the effect of closing the Ogden gateway to through passenger traffic from the east over the Gould lines, when destined to certain points in the northwest.

Compression of Export Cotton

Inman, Akers & Inman et al. v. Atlantic Coast Line. Opinion by Commissioner McChord:

The commission finds that the railway's practice of allowing for compression of cotton shipped over the Atlantic Coast Line from points on the Georgia Railroad and intended for export at such ports as Norfolk, Wilmington or Charleston, after the transportation service of the railroads is terminated, is unlawful, the service rendered being in no sense connected with the transportation. (32 I. C. C., 146.)

Rates Between Shreveport and Texarkana

In re class and commodity rates between Shreveport, La., and Texarkana, Ark. Opinion by Commissioner Meyer:

The commission finds that the carriers have justified proposed increased class rates between Shreveport, La., and Texarkana, Ark., and proposed increased rates on beer, beer substitutes, and agricultural implements in carloads from Shreveport to Texarkana, and on candy in less than carloads from Texarkana to Shreveport. (32 I. C. C., 180.)

Fabrication-In-Transit Privileges Refused Railway Car Industry

Middletown Car Company v. Pennsylvania Railroad et al. Opinion by Commissioner McChord:

The commission finds that there was no peculiar requirement incident to the pressed steel car industry, as is the case in the bridge and structural steel industry, which necessitates the extension of the fabrication-in-transit privilege to the pressed steel car industry with respect to the steel underframes for railroad cars. The fact that the fabricated articles are similar cannot warrant a similarity of treatment where it also appears that the similar articles are in no wise competitive. (32 I. C. C., 185.)

Rates on Lard Substitute from Greenville, Tex.

Texas Refining Company v. Alabama & Vicksburg et al. Opinion by Commissioner Meyer:

The commission finds that the present rates on lard substitute from Greenville, Tex., to points in Oklahoma, Arkansas, Louisiana, Mississippi and New Mexico are unreasonable and that the rates on this commodity should be the same as the rates on packing-house products. It is also held that the mileage-scale rates on packing-house products should apply on lard substitute from Greenville as a distinct point of origin and not as a common point with Fort Worth and Dallas. (32 I. C. C., 192.)

Joint Rates with the Iowa & Southwestern

Iowa & Southwestern v. Chicago, Burlington & Quincy. Opinion by Commissioner McChord:

The commission finds that the defendants should establish in connection with the complainants operating a line from Blan-

chard, Ia., to Clarinda through routes via Clarinda, Ia., with joint rates which shall place College Springs on a rate parity with Coin, Bradyville, and Shambaugh, Ia. The defendants will also be required to receive cars from complainants at Clarinda for switching to industries located on defendants' tracks at that point, and to establish a reasonable switching charge for the service. (32 I. C. C., 172.)

Rates on Coffee from New Orleans

In re coffee from New Orleans, La., Mobile, Ala.. and Pensacola, Fla., to Jacksonville, Fla., and other points. Opinion by the commission:

The commission finds the carriers have justified the proposed cancellation of the commodity rates on coffee to Jacksonville, Fla., of 35 cents per 100 lb., from New Orleans; 30 cents from Mobile and 26 cents from Pensacola, and a proposed restoration of the fifth-class rates of 44 cents from New Orleans, 39 cents from Mobile and 35 cents from Pensacola. These rates were reduced in order to allow New Orleans to compete with New York for the coffee trade to Jacksonville, but it has been found that although the rates are unreasonably low New Orleans has been unable to get a large portion of the total trade. (32 I. C. C. 90.)

Rates on Bakery Goods in the Pacific Northwest

Portland Chamber of Commerce et al. v. Chicago, Milwaukee & St. Paul et al. Opinion by Commissioner Meyer:

The commission finds that the classification of bakery goods in boxes and barrels, second class, and in cartons and tins in crates, first and second class, for interstate shipments in less than carloads from points in Oregon and Washington to points in Oregon, Washington, California, Idaho, and Montana, is unreasonable. It is held that such shipments should be rated not higher than third class, it being the general practice elsewhere in western classification territory for this traffic to move at commodity rates about equal to third class rates. (32 I. C. C., 188.)

Rates on Excess Baggage

National Baggage Committee v. Atchison, Topeka & Santa Fe et al. Opinion by Commissioner Hall:

In this complaint, filed in December, 1912, by the National Baggage Committee, representing numerous commercial organizations, against 69 carriers, operating in all sections of the country, the commission finds that the present rates on excess baggage are not unreasonable, but that the rates on baggage of excess value are unreasonable and should not exceed certain prescribed maxima.

Baggage of excess weight. As a general rule a purchaser of a first class ticket is entitled to receive the transportation of not more than 150 lb. of baggage of a value not exceeding $100. The rates are based as a rule upon 16⅔ per cent of the first class fare with a minimum of 15 cents per 100 lb., and a minimum charge of 25 cents. In some sections of the west the basis is 12 per cent instead of 16⅔ per cent, and in New England there is a minimum charge of 15 cents with an arbitrary scale graduated until the fare amounts to $4.20, from which point the 16⅔ per cent basis applies.

The commission is unable to sanction the basis proposed by complainant whereby there would be a graduated scale ranging from 12½ per cent for short distances, except those covered by the minimum rate, down to 8 per cent for long hauls. Complainant showed that for express service, claimed to be more valuable than excess baggage service, the railroads receive on an average 50 per cent of the gross revenues of the express companies; and claimed that for 100 lb. of excess baggage a reasonable rate would be one-half of the 100-lb. express rate plus a reasonable terminal charge, estimated at from 5 to 10 cents at each end. The commission rejects this theory and sees no necessary relation between the rates for the various services. The claim that the commercial traveler should have a lower rate than the occasional traveler is rejected. Congress has to some extent permitted the continuance of mileage books, with special privileges, but whether or not the principle should be extended is a question of policy with which the commission has nothing to do.

Much of the testimony on both sides consisted of opinions, speculation and surmise. The carriers were unable to give any data concerning the cost of the service or other factors which were considered in establishing the excess baggage rates, and whether these rates are reasonable or not is something not disclosed in the record and the commission can make no finding upon this point.

Baggage of excess value. The charge imposed for baggage valued in excess of $100 is, for each $100 or fraction thereof, generally equivalent to 10 per cent of the rate for 100 lb. of excess baggage, with a minimum rate of 10 cents per $100 and a minimum charge varying from 10 to 25 cents for increased valuation. Complainant proposes a charge which shall not exceed one-tenth of 1 per cent for each $100, with a minimum charge of 10 cents.

The commission, drawing attention to the fact that the allowance, included in the ticket, is 150 lb. of baggage of a value not exceeding $100 notes that apparently the carriers have proceeded on the assumption that the value of 150 lb. of baggage is usually $100. This arrangement is held to be unreasonable; to assume that $100 is a fair average value for 150 lb. of baggage is an unlawful attempt on the part of the carriers to limit their liability for loss and damage.

Attention is also drawn to the findings *in re Express Rates,* etc. (24 I. C. C., 380) in which it was said:

> The insurance charges almost universally prevailing on shipments conveyed by parcel post or other parcel-carrying systems in other countries are substantially one-tenth of 1 per cent—that is to say, 10 cents for each $100 or fraction thereof. This also is a customary rate with private insurers. Therefore it would seem to be a reasonable rule that the charges of express carriers in the United States based upon valuation in excess of $50 should not exceed this general standard, and that hereafter the valuation charge shall be 10 cents for each $100 or fraction thereof in excess of $50, and this irrespective of the rate of carriage.

It is ordered that the tariffs of the carriers should be amended so that the charges for excess value shall not exceed the following:

> Unless a greater sum is declared by the passenger and charges paid for increased valuation at time of delivery to carrier, the value of baggage, up to and including 150 lb., . . . shall be . . . agreed to be not in excess of $100 . . . and the value of baggage . . . exceeding said allowance of 150 lb. . . . upon which charges are paid . . . shall be . . . agreed to be not in excess of 66⅔ cents per lb.
>
> If the passenger, at the time of checking baggage, declares a value greater than $100 for the baggage . . . or, in case the weight of the baggage exceeds that allowed under the tariffs in connection with the transportation of a passenger, declares a value greater than 66⅔ cents per lb., there will be an additional charge at the rate of 10 cents for each $100, or fraction thereof, above such agreed maximum values.
>
> The minimum charge for increased valuation will be 10 cents. (32 I. C. C. 152.)

STATE COMMISSIONS

The Illinois Public Utilities Commission has suspended until March 30, the proposed charge for less-than-carload trap car service in Chicago on intrastate business, which was recently announced by the railway companies to become effective Decembr 1.

The Kansas railroads last week filed a petition with the Kansas Public Utilities Commission, asking the restoration of the three-cents-a-mile passenger fare which was in effect before 1907, when the railroads reduced rates to two cents, pending a final decision in the Nebraska rate case.

The executive council of the state of Maine, taking note of a widespread demand that the new Public Utilities Commission shall not consist of three lawyers, has refused to confirm the nomination of S. W. Gould, though it has accepted Benj. F. Cleaves and William E. Skelton, who are both lawyers. The governor has now named Hon. Charles W. Mullen of Bangor, a former mayor, and a prominent business man, for the third commissionership.

A complaint has been filed with the Public Service Commission of Missouri against the Quincy, Omaha & Kansas City and the Chicago, Burlington & Quincy, alleging that since July, 1912, the Quincy, Omaha & Kansas City has been owned and operated by the Burlington, and that this ownership does not entitle it to the exemption made by the Supreme Court of the United States in the state rate case decision, and that therefore it is not entitled to charge more than two cents a mile for passengers. The road is now charging 2½ cents.

COURT NEWS

Judge Harris, of the Circuit Court of Fulton, Mo., has sustained the demurrer of the Missouri, Kansas & Texas Railway to the suit brought by the attorney-general of Missouri to recover $2,000,000 alleged overcharges in freight and passenger rates during the litigation over the state rate laws.

Frank B. Kellogg, counsel for the Armour Car Lines in the investigation being conducted by the Interstate Commerce Commission into private car lines, has secured an order from a judge of the United States Supreme Court enjoining further hearings before the commission on the questions asked of the Armour Car Lines pending a review by the Supreme Court of an order issued by Judge Landis ordering Vice-President Frederick W. Ellis to answer the questions put to him by the commission regarding the relations of the car lines to the railroads. On November 9 Federal Judge Landis denied the petition for an appeal and ordered Mr. Ellis to appear before the commission and answer the questions.

The suit brought by John C. Fetzer, a real estate broker, against the Chicago & Western Indiana Railroad to set aside the decision of E. C. Field as arbitrator of the claims of the Chicago & Western Indiana against Fetzer, Benjamin Thomas, former president of the road, and C. R. Kappes, former real estate agent of the road, ordering the restoration of money alleged to have been misappropriated, was the subject of a hearing last week at Chicago, before Judge Sullivan. In 1910 the Western Indiana filed suits against the three men named, charging them with having misappropriated large sums of money in connection with real estate purchases for the road, and the case was settled out of court by arbitration, in which Mr. Field decided that the three men should pay to the Western Indiana $525,000. Fetzer then brought suit to have the award set aside on the ground that the money had been turned over by him to persons designated by the directors of the road, to be used for political purposes.

Railway Taxes in New Jersey

The New Jersey Court of Errors and Appeals, in a suit against the Long Dock Company, of Jersey City, concerning taxes on its railway property, sets aside the doctrine enunciated by the court below that the State Board of Assessors is a judicial tribunal whose findings can not be reviewed unless the principle upon which their determination was reached was "inherently and legally vicious." The opinion for the Court of Errors was written by Justice Swayze. It is held also that the members of the State Board of Assessors, even though they be regarded as a judicial body, may be subjected to cross examination as to their personal knowledge of values of railroad property, where that knowledge is employed in determining an assessment. Under the railroad tax law it is the duty of the Supreme Court to afford relief as well in cases where the amount of the tax is excessive or insufficient as in cases where the principle upon which the assessment is made is erroneous. The manifest intention of the legislature was to afford the railroads equal protection of the laws in common with other citizens.

Justice Swayze's opinion reverses the Supreme Court and sets aside assessments aggregating $7,383,180, levied by the State Board of Assessors upon the property in question. The decision is interpreted as limiting, to a great extent, the powers of the State Board of Assessors. Railroad tax case hearings, says the court, must be real and not sham hearings. It is expected that other railroads will take advantage of the decision to proceed against assessments believed to be excessive. Justice Swayze's decision affects the state assessors only, as that was the body dealt with in the opinion. The State Board for the Equalization of Taxes is a separate body and handles individual appeals in general matters.

FRENCH RAILWAY DELAYS.—A Reuter telegram from Bordeaux states that a government ordinance has been issued laying down the rule that railway lines are responsible for losses or damage when these are caused by the culpable mistakes of their agents and cannot be attributed to the war. Nevertheless, their responsibility does not extend to damage or waste which by nature of the merchandise concerned may arise owing to the length of time taken in transit, and railway lines do not incur any responsibility for the time taken in carrying merchandise.

Railway Officers

Executive, Financial, Legal and Accounting

David McNicoll, vice-president of the Canadian Pacific at Montreal, Que., has resigned on account of ill health, effective January 1, next, and will be succeeded by George Bury, vice-president at Winnipeg, Manitoba. Mr. McNicoll will remain as a member of the board of directors.

C. G. Austin, Jr., whose appointment as general solicitor of the Chicago & Western Indiana and the Belt Railway of Chicago, with headquarters at Chicago, has already been announced in these columns, was born in Highgate, Vt., February 6, 1879. He received his academic education at Brigham Academy in Vermont and was graduated from the University of Wisconsin in 1902 with the degree LL.B. He was admitted to the bar of Vermont in 1901, the year before his graduation from law school, and was engaged in the general practice of law in St. Albans, Vt., with his father and brother under the firm name of C. G. Austin & Sons, from the time of his graduation until June, 1909. He then removed to Cedar Rapids, Iowa, where, as assistant solicitor for the Chicago, Milwaukee & St. Paul, he acted as trial attorney for that company for the state of Iowa. He resigned in April, 1910, to accept a position in the law department of the Chicago & Western Indiana and the Belt Railway of Chicago, where he has since remained, now assuming full charge of the law departments as general solicitor, as above noted.

E. W. McKenna, whose retirement from the position of vice-president of the Chicago, Milwaukee & St. Paul, has already been announced in these columns, was born October 24, 1848, at Pittsburgh, Pa. He began railway work in May, 1862, with the Pennsylvania, and was messenger and operator until June, 1864, when he was in United States military telegraph service. From April, 1866, to December, 1869, he was with the Pittsburgh, Cincinnati & St. Louis as operator, freight clerk and general superintendent's clerk. He was then for one year train despatcher, and from February, 1871, to April, 1880, superintendent, of the Indianapolis & Vincennes, and the following five years was superintendent of the Jeffersonville, Madison & Indianapolis. During 1886 he was engaged in special work under the direction of the general manager of the Pennsylvania Lines West of Pittsburgh. Mr. McKenna became connected with the Chicago, Milwaukee & St. Paul in June, 1887, and was division superintendent until October, 1890, when he was appointed assistant general superintendent of that road. He left the St. Paul in August, 1894, to become general superintendent of the Eastern district of the Great Northern at St. Paul, Minn., resigning that position to engage in the business of renewing steel rails, being the inventor of a process for securing that result. He organized the McKenna Steel Working Company, of which he was president for a number of years. Mr. McKenna returned to the Chicago, Milwaukee & St. Paul in February, 1904, as assistant to the president, and in September of the following year he was made second vice-president. In September, 1909, he became vice-president of the same road in charge of operation and construction.

E. W. McKenna

Operating

P. R. Albright, assistant to general manager of the Atlantic Coast Line at Wilmington, N. C., has been elected assistant general manager.

T. R. Ryan, formerly traffic manager of the Mexico North-Western, who went to Brazil last January as traffic director of the Brazil Railway Company and its subsidiary companies, in addition to his former duties, has been made sub and acting managing director of the Brazil Railways and general superintendent of the Sorocobana Railway Company, one of the subsidiary companies, with headquarters at Sau Paulo, Brazil.

Traffic

A. F. Pilcher has been appointed general agent of the Rock Island lines at Sioux Falls, S. D.

Samuel W. Carder has been appointed commercial agent of the New York Central Fast Freight Lines, with headquarters at Omaha, Neb., succeeding J. J. Monks, promoted.

H. L. Hudson has been appointed district freight agent of the Union Pacific at Seattle, Wash., and L. M. Foss has been appointed district freight and passenger agent at Lewiston, Idaho.

Herbert L. Fairfield has been appointed manager of baggage and mail traffic of the Illinois Central and the Yazoo & Mississippi Valley, with supervision over the handling of baggage, mail, express and milk traffic, with headquarters at Chicago.

I. L. Graves, coal freight agent of the Southern Railway at Atlanta, Ga., has been appointed general freight agent, with headquarters at Knoxville, Tenn., succeeding H. L. Miller, resigned to go to another company, and the office of coal freight agent at Atlanta has been abolished.

Charles S. Lee, general passenger agent of the Lehigh Valley at New York has been appointed passenger traffic manager. George W. Hay, general baggage agent at South Bethlehem, Pa., has been promoted to general passenger agent, with headquarters at New York. A. J. Simmons, general eastern passenger agent at New York, has been appointed assistant general passenger agent, with office at New York, and Paul S. Millspaugh, general agent of the passenger department at Ithaca, N. Y., has been appointed assistant general passenger agent, with headquarters at Buffalo.

Engineering and Rolling Stock

E. H. McCann has been appointed master mechanic of the San Antonio, Uvalde & Gulf, with headquarters at Pleasanton, Tex., succeeding J. H. Ruxton, resigned, whose title was superintendent of motive power.

OBITUARY

Harry Dean, division freight agent of the Pere Marquette at Detroit, Mich., died on November 22, in Detroit. He had been in the service of this company for the past 18 years.

James Bissett, formerly master mechanic of the St. Louis & San Francisco, at Springfield, Mo., died on November 11, in Springfield at the age of 74. He began railway work at the age of fourteen, with the North Madison Railway, at North Madison, Ind., and subsequently served on different railroads. In October, 1899, he entered the service of the Kansas City, Fort Scott & Memphis at the South Side shops, Springfield, and later served as master mechanic of its successor, the St. Louis & San Francisco, until his retirement, under the pension rules of the company, about two years ago.

John C. Muir, general superintendent of the Chicago, Terre Haute & Southeastern, died at Terre Haute, Ind., on November 4, aged 50 years. Mr. Muir began railway work in June, 1879, as messenger for the Atchison, Topeka & Santa Fe, with which road he remained until August, 1895, being employed successively as telegraph operator, station agent, traveling auditor, train despatcher, and chief train despatcher. He then went to the Chicago & Eastern Illinois as chief train despatcher, and subsequently was trainmaster and superintendent until June, 1911, when he was appointed general superintendent at Danville, Ill. In November of the following year he became superintendent of the Chicago division at Danville, resigning in March, 1913, to go to the Chicago, Terre Haute & Southeastern as general superintendent at Terre Haute, Ind.

Equipment and Supplies

LOCOMOTIVE BUILDING

THE MAINE CENTRAL has ordered 7 Mikado type locomotives from the American Locomotive Company.

THE A. GUTHRIE CONSTRUCTION COMPANY, St. Paul, has ordered 3 heavy-switching locomotives from the Baldwin Locomotive Works.

CAR BUILDING

THE PERE MARQUETTE has ordered 200 center constructions from the Pressed Steel Car Company.

THE ATCHISON, TOPEKA & SANTA FE has ordered 100 tank cars from the Pressed Steel Car Company.

THE UNITED STATES GOVERNMENT, Department of Reclamation Service, has ordered one 55-ft. all-steel, 200-hp., 75-passenger motor car from the McKeen Motor Car Company for its Yuma Valley Railway in Arizona.

RAILWAY FARM DEMONSTRATION WORK IN THE PHILIPPINES.—A report of the progress of the agricultural demonstration coach sent out by the Philippine Bureau of Agriculture over the Manila Railroad has been issued. The car, which was on the road from March 26 to August 5, made one to three day stops at all the towns on the main and branch lines between Bauan, La Union Province, and Pagbilao, in Tayabas Province. This was the second tour of the car through the same territory. It passed through 11 provinces and made stops at 84 towns. It is stated that 22,176 persons visited the car during the tour, and 5,702 agricultural publications were given out and 66 illustrated lectures were given, with a total attendance of 36,552 people. The car was in charge of the trained employees of the bureau, who gave demonstrations during the day and illustrated lectures at night, the subjects covered in the latter being rice and sugar production, animal industry, locust extermination, and vegetable and fruit culture. Some 200 lantern slides were used. The car also carried modern farm implements for demonstration purposes. A noticeable result of the tour is the disposition of the farmers along the route to discard old agricultural implements and acquire the more modern and effective ones.

ARGENTINE RAILWAY RESULTS.—The present year has been a decidedly adverse period in Argentine railway history, revenue having fallen off, while flood difficulties have also had to be contended with. Floods commenced in August and September, 1913, and resulted in considerable loss of traffic and damage to the property of the Buenos Ayres Great Southern, amounting to over $500,000. No sooner was the flood difficulty got over, than Argentina was visited by hot, dry winds and drought, which caused the failure of cereals in the southern portion of the company's zone. Rains, which set in again in the latter part of the company's financial year, caused dislocation of agricultural business and delayed the transport of the maize crop, a great part of which still remains to be carried. During the past financial year 145 miles of extensions were opened for traffic by the Buenos Ayres Great Southern, bringing its total completed lines up to 3,727 miles. The company is now restricting its expenditure upon capital account, only absolutely essential works being undertaken. In view of the working difficulties experienced by the Great Southern Railway in 1913-14, it is not surprising to find that the traffic receipts declined to $26,557,898, as compared with $31,927,007 in 1912-13. On the other hand, the working expenses were brought down to $15,552,452, as compared with $18,037,121, so that the decline in the net revenue was reduced to $2,944,450. A transporter bridge built for road traffic between the capital and Avellaneda and the Sud Dock were brought into operation in June, and by a presidential decree the government formally accepted the bridge from the company.—*Engineering.*

Supply Trade News

Eli F. Hart, one of the founders and the chairman of the board of the Rodger Ballast Car Company, Chicago, died at his home in Chicago on November 23. Mr. Hart was born at Rochester, N. Y., in 1832.

After sixteen years service with Hermann Boker & Co., New York, Ellsworth Haring has terminated his connection with that company, and has organized a business in tool steel and related specialties, with temporary offices at 684a Hancock street, Brooklyn, N. Y.

E. A. Sterling, forest and timber engineer, 1331 Real Estate Trust building, Philadelphia, Pa., has moved to 925 Commercial Trust building, Fifteenth and Market streets. This change of address also includes the offices of Clark, Lyford & Sterling, and the Philadelphia-Vancouver Timber Company.

TRADE PUBLICATIONS

CONCRETE MIXERS.—The T. L. Smith Company, Milwaukee, Wis., has just issued folder No. 430, which is devoted to illustrations and the description of its latest type of non-tilting concrete mixer, known as the Smith Mixerette.

STEEL FENCE POSTS.—The Carbo Steel Post Company has recently issued a 32-page booklet describing the construction and principles of its spring steel field fence post, and illustrates how they should be installed. It also gives a comparison of prices of the steel with the wooden posts.

COALING STATIONS.—The Roberts & Schaefer Company, Chicago, has issued a four-page folder illustrating some of the latest reinforced concrete Holmen coaling plants. The bulletin shows briefly the method of operation of some of the coaling stations furnished by the company, and contains a list of the installations made since January 1.

THE KEWANEE UNION.—The National Tube Company, Pittsburgh, Pa., has recently issued a circular relating to its male and female pattern Kewanee union. The following saving is said to be effected by this union: one nipple; the time required for making one less joint; one gasket; the time required for cutting and fitting that gasket, and the cost of one malleable union, an average net saving of 16 cents.

TRAIN LIGHTING SYSTEM.—"Safety Electric Light" is the title of an attractive booklet which has been recently issued by the Safety Car Heating & Lighting Company, New York, descriptive of the Safety Axle Driven Car Lighting System. The booklet describes the system in detail and contains illustrations of the various parts of the dynamo, the dynamo regulator, etc. There is also a section giving instructions for operation and installation, and another, giving cross-sections of the various safety dynamos and the names and numbers of their parts.

ELECTRICAL APPARATUS.—The General Electric Company has recently issued a number of bulletins as follows: Bulletin No. 40,500, entitled "Alternating Current Generators for Direct Connection to Reciprocating Engines," illustrates and describes some of the recent improvements in the alternators built by the company for direct connection to steam, oil and gas engines. Bulletin No. 46,018 describes the company's type P-8 Portable Voltmeter. This is an unusually small instrument enclosed in a mahogany case, suitable for use on both alternating and direct current. Bulletin No. 44,404 describes one of the company's new line of Ventilated Commutating Pole Motors. This motor has a rate capacity of 80 hp. on 600 volts. The motor has a special feature in its induced ventilation, and is said to have a greater service capacity than motors of the closed type having the same hourly rating. Bulletin No. 41,500 is entitled "Small Direct and Alternating Current Motors of the Drawn Shell Type." These are all fractional horse-power motors, which have been specially designed for application to the diversified forms of small machines which may be driven by electricity.

Railway Construction

BOSTON SUBWAYS.—Bids are wanted by the Boston Transit Commission, Boston, Mass., until December 5, for constructing that section of the Dorchester tunnel which will pass under Fort Point channel, thence to the corner of West Second street and Dorchester avenue in South Boston. This section will be about 3,200 ft. long.

CHARLES CITY WESTERN.—An officer writes that this company has projected an 18-mile extension from Charles City, Iowa, to a point on the Chicago Great Western. The company now operates a line from Charles City, southwest to Marble Rock 13 miles.

CHATTAHOOCHEE VALLEY.—An officer writes confirming the report that surveys have been made for a proposed extension from McCulloch, Ala., to a connection with a line to Columbus, about 15 miles. The right of way has also been secured but construction work has not yet been started. (August 21, p. 369.)

CHICAGO, PEORIA & QUINCY (Electric).—This company, which was organized last year to build from Peoria, Ill., southwest about 120 miles to Quincy, is now making surveys for the line, but has not yet started construction work. The Chapman Company, 1710 Steger building, Chicago, may be addressed. (June 12, p. 1356.)

GRAND MARAIS & NORTHWESTERN.—An officer writes that a contract has been given to John Bergman, Duluth, Minn., and work is under way building from Grand Marais, Minn., west to Cascade Junction, 20 miles, and that surveys are being made for an extension from Cascade Junction west to Ely, 55 miles. A. Mitchell, president, Duluth, Minn. (January 16, p. 149.)

KINSTON CAROLINA RAILROAD & LUMBER COMPANY.—We are told that this company has projected an extension from Pink Hill, N. C., south to Chinquapin, 15 miles. (October 23, p. 779.)

LULA-HOMER.—We are told that this company has been organized to build from Lula, Ga., southeast to Homer, 14 miles. The line is to have maximum grades of 2.5 per cent and maximum curvature of 9 deg. It has not yet been decided when bids will be asked for building the line. The principal commodities to be carried will be farm produce and the products of mines. D. G. Zeigler & Son, Lula, may be addressed. (November 13, p. 924.)

MORGANTOWN & WHEELING (Electric).—An officer of this company writes that grading work has been finished and track laying is to be started at once from Cassville, W. Va., west to Blacksville, 15 miles. Keeley Brothers & Gilmore, Morgantown, W. Va., are the contractors. Track has been laid on about a half mile at Cassville. Surveys have been made and most of the right of way secured for an extension from Blacksville to Wheeling, 52 miles. R. D. Hennen, chief engineer, Morgantown. (May 15, p. 1118.)

NEW YORK SUBWAYS.—Bids are wanted by the New York Public Service Commission, First district, until December 11, for the construction of Section No. 4 of Routes Nos. 4 and 36, that part of the new Broadway subway in the borough of Manhattan extending northerly under Seventh avenue from Fifty-first street to a connection with the crosstown part of the line in Fifty-ninth street.

QUEBEC CENTRAL.—An officer writes that work is now underway by P. J. Wolfe, Sherbrooke, Que., on a section of 10 miles, and by Z. C. Howard & Co., also of Sherbrooke, on a section of 5 miles, of an extension being built from a point 10 miles east of St. Sabine, Que., to Lac La Frontier. (July 3, p. 40.)

ROME & NORTHERN.—An officer writes that surveys are now being made for the extension to be built from Gore, Ga., north to Subligna, 8.4 miles.

TEMISKAMING & NORTHERN ONTARIO.—An officer writes regarding the report that a line may be built from Cochrane, Ont., to Port Nelson, that the provincial government has not seriously considered building such an extension as it would involve the construction of about 750 miles of railway and much of the route

would be through an unexplored wilderness. A reconnaissance survey for an extension from Cochrane to Moose Factory at the south end of James Bay, 185 miles, has been made. It will be practicable to develop a harbor at this place which is the nearest point on James or Hudson Bay to the settled portions of eastern Canada along the Great Lakes and St. Lawrence river.

Tennessee Railway.—An officer writes that surveys are now being made for building an extension from Charleys Branch to Petros, Tenn., 11.25 miles.

Toronto Eastern (Electric).—An officer of this company which was organized to build a line through Pickering, Whitby, Oshawa and Bowmanville, Ont., writes that track has been laid on a total of 14.53 miles, which includes the section from Whitby to Bowmanville, 11.47 miles, and work is now under way between Whitby and Pickering on five miles. Ewan MacKenzie, Toronto, Ont., is the contractor. Surveys are now being made for an extension from Pickering to a point in the township of Scarboro, 15 miles. E. W. Oliver, chief engineer, Toronto. (January 9, p. 102.)

RAILWAY STRUCTURES

Houston, Tex.—The International & Great Northern is building a one-span Strauss bascule bridge over Buffalo Bayou, near Houston. The contract for the steel, amounting to 468 tons, was awarded the Wisconsin Bridge & Iron Company, and the contract for erection went to the American Construction Company. Work is about 10 per cent completed. The total estimated cost is $36,000.

Pawtucket, R. I.—A contract for building the new station for the New York, New Haven & Hartford on the dividing line between the cities of Pawtucket and Central Falls to replace two old stations has been given to Norcross Brothers, Worcester, Mass. The new structure is to be of brick and stone construction. It will be an overhead station built 21 ft. above the track level, which at this point is located in a deep cut. The station will have two island platforms 900 ft. long, reached by six stairways. The waiting room will be 92 ft. long, 64 ft. wide and 32 ft. high. The building will be 84 ft. by 162 ft. with two wings, and the work will cost about $200,000. A contract was given last summer to C. W. Blakeslee & Sons on a unit price basis for the foundations. This improvement is part of the grade crossing elimination work at Pawtucket and Central Falls under way for the past two years. The work involves the elimination of all grade crossings, and the four tracking and relocation of tracks to take out the curve on the main line at this point.

Portsmouth, Va.—We are told that a contract has been given by the Seaboard Air Line to the Richardson Construction Company, Inc., Norfolk, Va., for work on the general office building and terminal station at High street in Portsmouth. The plans call for a structure five stories high on pile foundation, to be from 60 to 72 ft. wide and about 155 ft. long, with brick walls and reinforced concrete floors and roof.

Notes on English Railway Signaling History.—Although neither fixed signals nor the block system were first introduced on the London, Brighton & South Coast, that company's line may be regarded as being the garden within which they grew and multiplied. Stewart's Lane Junction and the Hole-in-the-Wall signal towers were among the very first erected, and at Brighton, in 1861, a tower was provided with 37 levers installed therein. No doubt the fact that both John Saxby and J. S. Farmer had been connected with that railway had something to do with the progress signaling made on the Brighton. It was on that railway also that fish-tailed arms for distant signals were introduced. This was done in August, 1872, when two distant signals at Norwood Junction were so distinguished. The Brighton Company cannot claim to be the first to adopt the "lock-and-block." W. R. Sykes—the last survivor of the old school—must be given the credit for inventing patent No. 662 of 1875—the first complete method of interlocking the fixed signals with the block instruments; but after the Arlesey accident of December, 1876, Charles Hodgson, of Saxby & Farmer, invented patent No. 400 of January, 1877—a lock-and-block system, which was installed on a section of the Brighton Railway.

Railway Financial News

Bangor & Aroostook.—In the fiscal year ended June 30, 1914, this company, operating 631 miles in the state of Maine, had gross revenue from operation of $3,795,413, an increase of $542,991 over the previous year and the largest in the company's history. The net income after the payment of expenses, rentals, taxes and interest was $205,731, as against a net loss of $84,307 in 1913. The increase in gross revenue was shown in both passenger and freight traffic, but that the amount is so large is mainly due to a tonnage of potatoes of 526,578 (of a total of 1,902,745) as against 372,681 tons in 1913. The company, on the other hand, also had increased expenditures, very largely the result of the severe winter.

The Bangor & Aroostook operates a line through the state of Maine from Penobscot Bay and Bangor north through Aroostook county to points on the Canadian border such as Houlton, Fort Fairfield, Van Buren, Fort Kent and St. Francis. It also has a branch to Greenville in the Moosehead Lake region. The road thus serves a large portion of the hunting district of Maine. It is not part of a through route but derives the larger portion of its revenue from the traffic in potatoes, lumber and other forest products, and paper which originates in its own territory; the tonnage of these products in 1914, being potatoes, 526,578; lumber, 352,847; other forest products 304,481 and paper, 168,264, of a total of 1,902,745 tons.

In the fiscal year ended June 30, 1914, the road earned $6,019 per mile of road, of which $4,693 was freight revenue, as compared with $5,158 revenue per mile of road of which $3,890 was freight revenue, in 1913. The ton-mile rate in 1914 was 1.225 cents as against 1.146 cents in the previous year, the total ton mileage carried being 1,902,745 tons, as noted above, as against 1,620,065 in 1913. The number of passengers carried in 1914 was 817,282 as compared with 781,519 in 1913, the average receipts per passenger mile being 2.350 cents and 2.309 cents in 1914 and 1913, respectively. The company during the year paid 3½ per cent dividends. On June 30, 1914, it had on hand $450,226 cash with loans and bills payable of $1,215,000.

Erie.—The stockholders, at a special meeting on November 17, approved the making of a refunding and improvement mortgage under which a total of $300,000,000 bonds may be issued. This provides for the refunding of all outstanding securities.

Kanawha & Michigan.—The annual report of this company shows that in the fiscal year ended June 30, 1914, it had net income after the payment of expenses, rentals, taxes and interest of $816,448, as compared with $1,005,396 in 1913. This decrease of $188,948 is the result of strikes at the coal mines which began in Ohio April 1, 1914, and in West Virginia on May 1, and continued until after the close of the fiscal year.

The Kanawha & Michigan operates a total of 177 miles of line. The main line extends from Corning, O., to Hobson and from Kanauga, O., to Gauley Bridge, West Va. In the fiscal year ended June 30, 1914, the company earned operating revenue per mile of road of $17,611, as compared with $18,705 in 1913. The total ton mileage of revenue freight was 660,476,000, a decrease of 7.27 per cent. The average receipts per ton per mile were 4.02 mills, about the same as in 1913, and the average trainload was 959 tons, an increase of 22 tons, or 2.35 per cent. During the year there was an actual loss of coal and coke traffic of 230,353, nearly all of which was due to the strike in April, May and June. This loss was even greater than the loss in total revenue, which makes it worth noting that over three-quarters of the Kanawha & Michigan's total tonnage of freight is made up of bituminous coal. The total number of passengers carried in the fiscal year was 1,231,119 as compared with 1,269,783 in 1913. The average passenger receipts per passenger mile in 1914 were 1.94 cents, and in 1913, 1.91 cents. Dividends paid during the year amounted to $450,000 at the rate of 5 per cent. The balance carried to credit of profit and loss, therefore, was $366,448. At the end of the year the company had on hand cash to the amount of $139,129. The total working assets were $1,016,661, and the total working liabilities were but $693,606. The expenditures for additions and betterments in 1914 totaled $273,042.